ORDER NO. KM40009704C1

F12

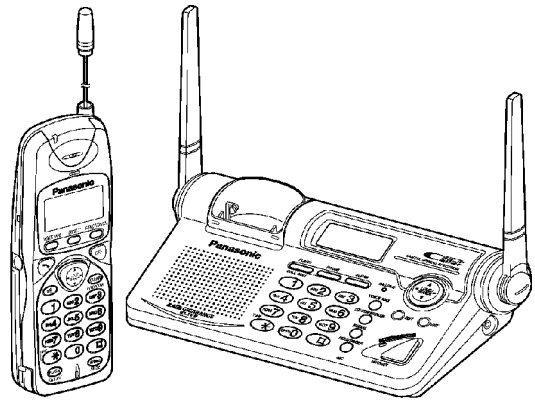
# Service Manual

## Telephone Equipment

Caller ID Compatible

## KX-TG2650N

## 2.4GHz Digital Cordless Phone
## Champagne gold Version
## (for U.S.A.)



(Handset) (Base Unit)

## SPECIFICATIONS

**SPECIFICATIONS**

| | Base Unit | Handset |
|---|---|---|
| Power Source: | AC Adaptor (PQWATG2650N) | Rechargeable Ni-MH battery |
| Receiving Frequency: | 24 channels within 2.4015~2.4705 GHz | 24 channels within 2.4015~2.4705 GHz |
| Receiving Method: | Direct conversion | Direct conversion |
| Transmitting Frequency: | 24 channels within 2.4015~2.4705 GHz | 24 channels within 2.4015~2.4705 GHz |
| Oscillation Method: | PLL synthesizer | PLL synthesizer |
| Tolerance of OSC Frequency: | 24 MHz ± 720 Hz | 24 MHz ± 720 Hz |
| Modulation Method: | NA (FSK/SS) | NA (FSK/SS) |
| Spread spectrum Method: | Direct sequence | Direct sequence |
| Chip rate | 15 chip | 15 chip |
| ID Code: | 22-bit | 22-bit |
| Dial Mode: | Tone (DTMF)/Pulse | Tone (DTMF)/Pulse |
| Redial: | Up to 32 digits | Up to 32 digits |
| Speed Dialer: | | Up to 48 digits |
| Power Consumption: | | 11 days at Standby, 4.5 hours at Talk (maximum) |
| Dimension (H × W × D): | $2^{11}/_{32}$" × $9^{5}/_{32}$" × 6" (60 × 233 × 153 mm) | $5^{25}/_{32}$" × $1^{31}/_{32}$" × $1^{13}/_{32}$" (147 × 50 × 36 mm) |
| Weight | 0.99 lbs. (450 g) | 0.37 lbs. (170 g) |

Design and specifications are subject to change without notice.

**⚠ WARNING**

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic

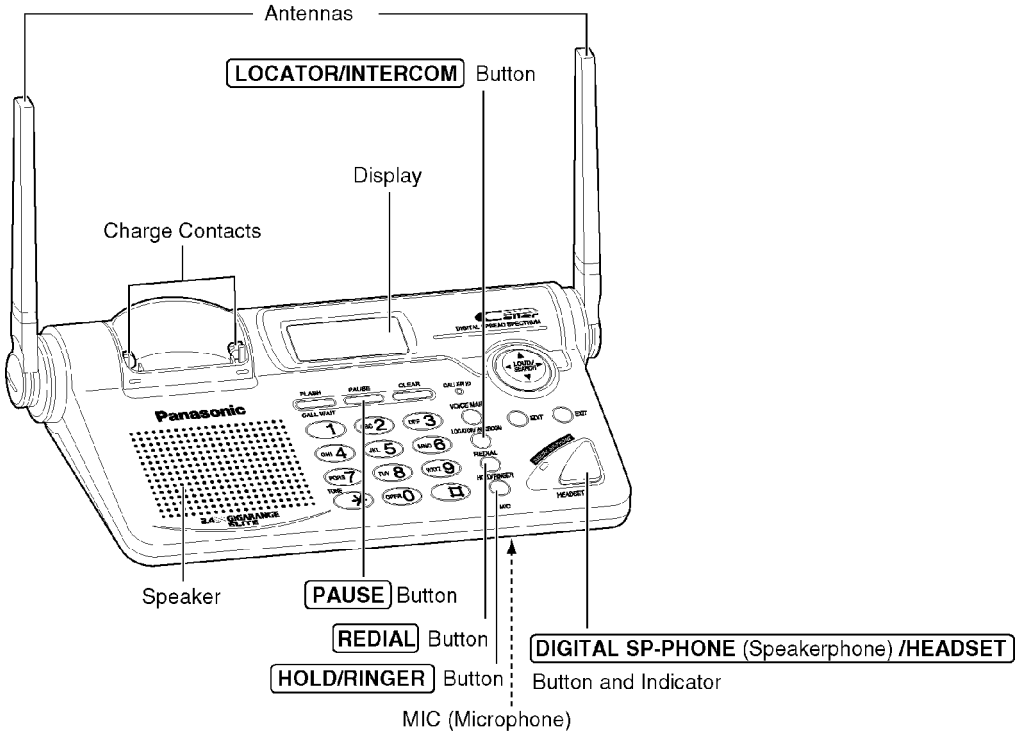
When you mention the serial number, write down all 11 digits. The serial number may be found on the label affixed to the bottom of the unit.

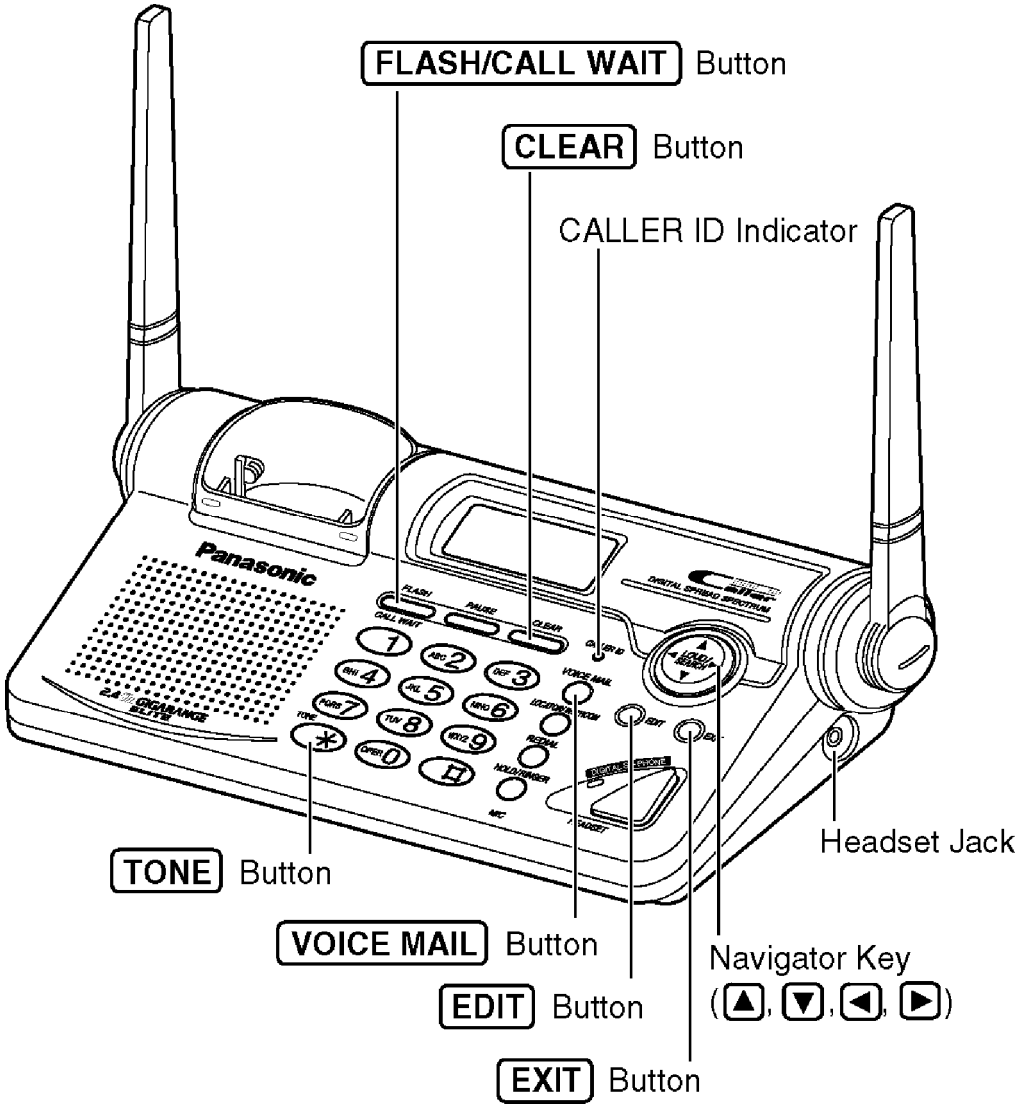
## FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
**When replacing, the following precautions will help prevent recurring malfunctions.**
1. Cover the plastic parts boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the work table.
4. Do not grasp IC or LSI pins with bare fingers.

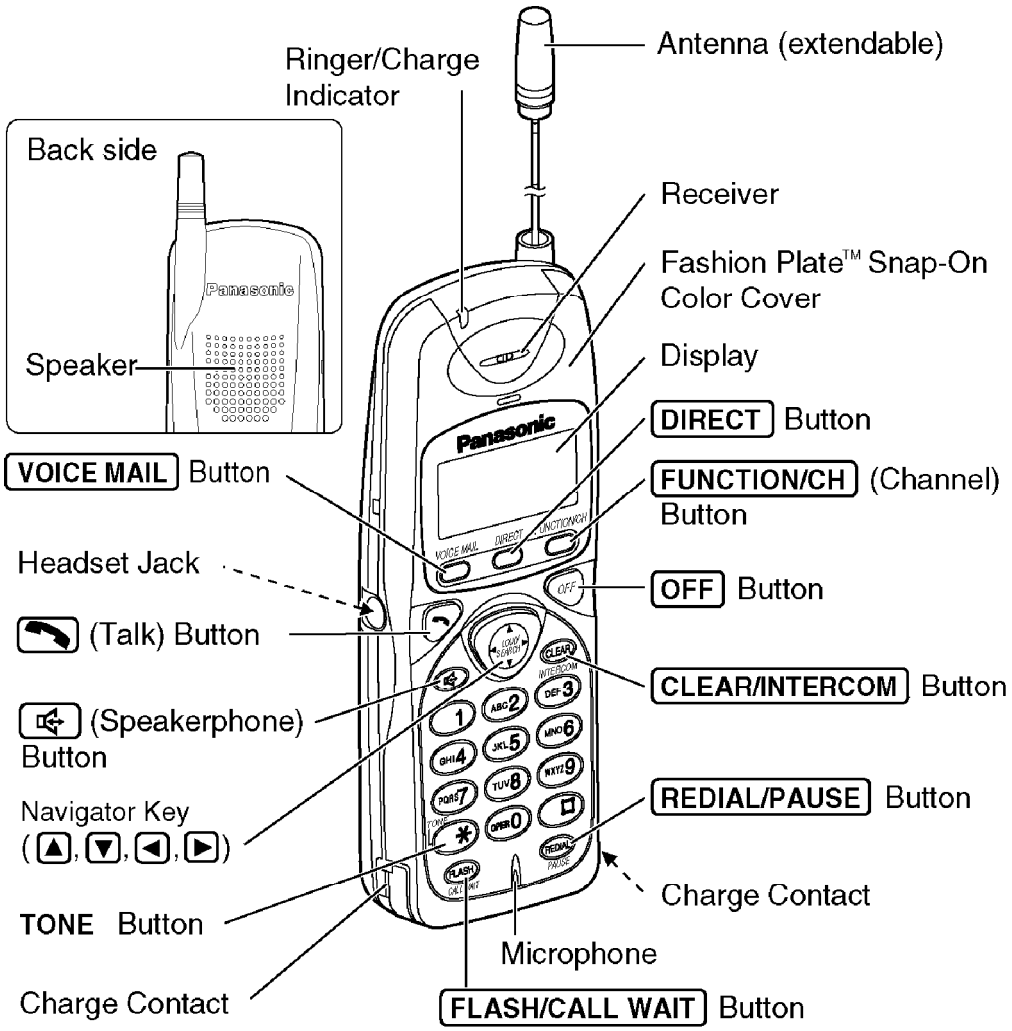
# 1. LOCATION OF CONTROLS

## 1.1. Base Unit



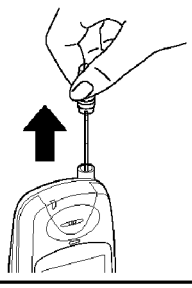

FLASH/CALL WAIT Button
CLEAR Button
CALLER ID Indicator
Panasonic
TONE Button
VOICE MAIL Button
EDIT Button
EXIT Button
Navigator Key
(▲, ▼, ◀, ▶)
Headset Jack

## 1.2. Handset

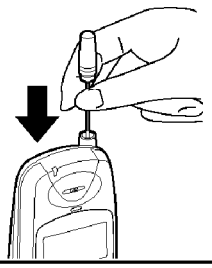



**How to handle the handset antenna:**

You can even use the handset without extending the antenna. But for best performance, extend the antenna fully until it locks into position.



To put away the antenna, slide down vertically holding the lower part until it stops.

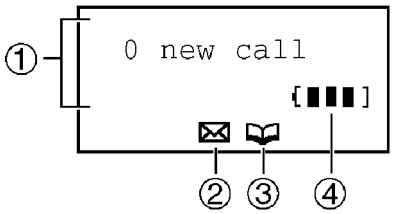


# 2. DISPLAYS

**Both the handset and the base unit show you instructions and information on the displays. These display prompts are shown below.**

## 2.1. Common Prompts for the Handset and the Base Unit

### Handset




① The display shows the dialed number, call status, programming options and directory items etc. If you subscribe to a Caller ID service, caller information will be displayed. The number of new calls will be also displayed.

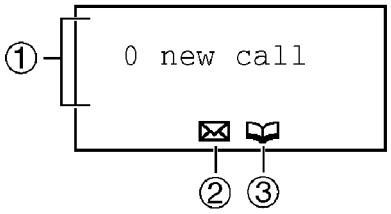
② The voice mail icon indicates you have received voice mail messages.

③ The directory icon displays when storing or viewing the directory items.

④ The battery icon indicates the battery strength.

**Standby mode:**
While the handset is off the base unit, the display becomes blank after you finish using the handset (making/answering a call, viewing the Caller List or directory list etc.). The handset can receive calls. The battery life is conserved in this state. While the handset is on the base unit, the battery icon and the number of new Caller ID calls are displayed in the standby mode.

### Base unit




① The display shows the dialed number, call status, programming options and directory items etc.
If you subscribe to a Caller ID service, caller information will be displayed.
The number of new calls will be also displayed.

② The voice mail icon indicates you have received voice mail messages.

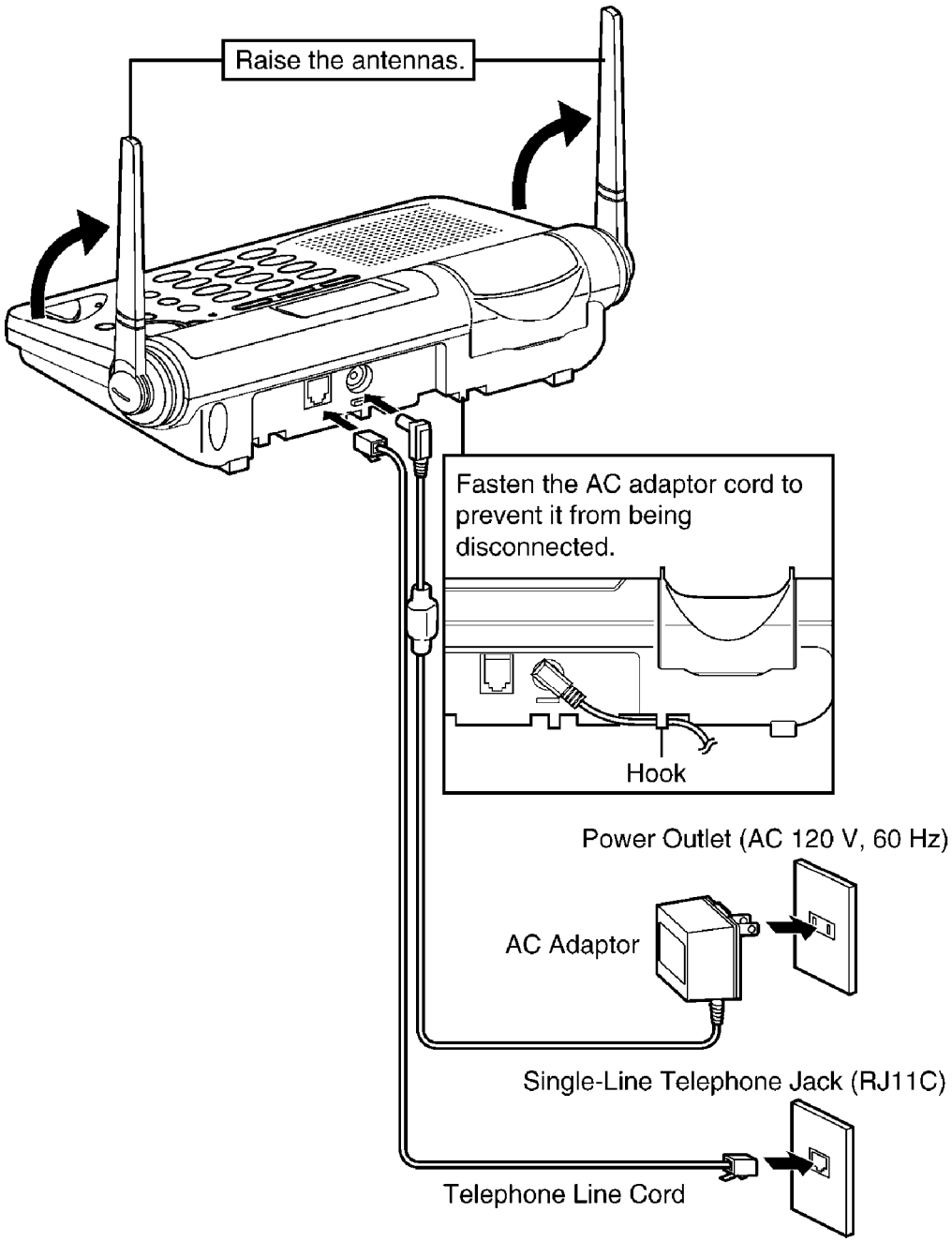
③ The directory icon displays when viewing the directory items.

### Backlight LCD Displays

The handset and the base unit have the backlight LCD displays. Each display will light when you start using the handset or the base unit, and when a call is received. The handset display light will stay on for about 10 seconds after pressing a button or lifting the handset off the base unit. You can change the backlight color to orange for certain callers by storing them in the directory.

# 3. SETTINGS

## 3.1. Connections


Raise the antennas.
Fasten the AC adaptor cord to prevent it from being disconnected.
Hook
Power Outlet (AC 120 V, 60 Hz)
AC Adaptor
Single-Line Telephone Jack (RJ11C)
Telephone Line Cord

**Note:**

- **USE ONLY WITH Panasonic AC ADAPTOR PQLV10 (Order No. PQWATG2650N).**
- **The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)**
- **If your unit is connected to a PBX which does not support Caller ID services, you cannot access those services.**

## 3.2. Battery Charge

### 3.2.1. Battery Strength

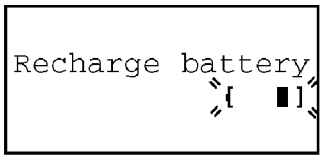
You can check the battery strength on the handset display while the handset is on the base unit, while it is in use (making/answering a call etc.), or after viewing the Caller List or directory items, programming etc. The battery strength will remain for 5 seconds after using the handset, then the display will return to the standby mode.

The battery strength is as shown in the chart below.

| Display prompt | Battery strength |
|---|---|
| [▮▮▮] | High |
| [ ▮▮] | Medium |
| [ ▮] | Low |
| [ ▮] (flashing) | Needs to be recharged. |

- If the battery has been fully charged, the ringer/charge indicator will light in green.

### 3.2.2. Recharge




Recharge the battery when:
– "Recharge battery" is displayed on the handset,
– "[ ▮]" flashes on the display, or
–the handset beeps intermittently while it is in use.

- If you DO NOT recharge the handset battery for more than 15 minutes, the display will keep indicating "Recharge battery" and/or "[ ▮]" will continue to flash.

### 3.2.3. Battery Information

After your Panasonic battery is fully charged:

| Operation | | Approx. battery life |
|---|---|---|
| While in use (TALK) | near the base unit* | Up to 4.5 hours |
| | away from the base unit | Up to 3.5 hours |
| While not in use (Standby) | | Up to 11 days |

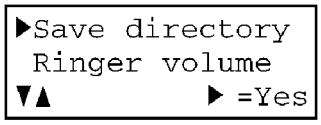
* Within about 10 feet (3 m)

- Battery life may be shortened depending on usage conditions, such as viewing the Caller ID Caller List or directory list, and ambient temperature.
- **Clean the handset and the base unit charge contacts with a soft, dry cloth. Clean if the unit is subject to grease, dust orhigh humidity.** Otherwise the battery may not charge properly.
- If the battery is fully charged, you do not have to place the handset on the base unit until "Recharge battery" is displayed and/or "[ ▮]" flashes. This will maximize the battery life.
- The battery cannot be overcharged.

## 3.3. Selecting the Dialing Mode

You can program the dialing mode **using the handset near the base unit**.
If you have touch tone service, set to "Tone". If rotary or pulse service is used, set to "Pulse". Your phone comes from the factory set to "Tone".
**Make sure the unit is in the standby mode initially.**

1 Press [FUNCTION/CH].

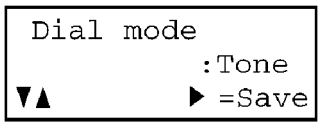



2 Press [▼] or [▲] repeatedly until the arrow points to "Program".

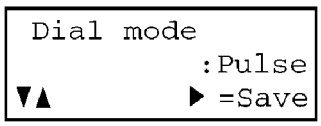
3 Press [▶] (Yes key).

4 Press [▼] or [▲] repeatedly until the arrow points to "Set dial mode".

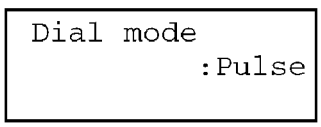
5 Press [▶] (Yes key).




6 Press [▼] or [▲] to select "Pulse" or "Tone".




7 Press [▶] (Save key).
- A beep sounds.
- To return to the standby mode, press [OFF].

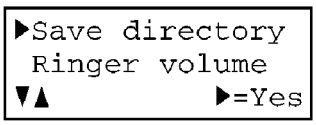



- You can exit the programming mode any time by pressing [OFF].
- If the handset has lost communication with the base unit, 3 beeps sound and "No link to base. Place on cradle and try again." is displayed.

## 3.4. Selecting the Line Mode

If the line is connected to a low voltage system such as a PBX, set to “B”. Otherwise the Call Waiting Caller ID Feature may not be used.
Your phone comes from the factory set to “A”.
**Use the handset near the base unit.**
**Make sure the unit is in the standby mode initially.**

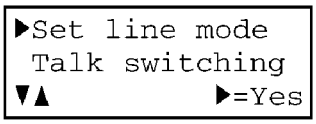
1 Press [FUNCTION/CH].



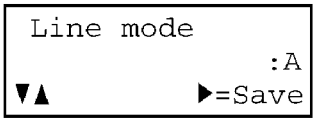

2 Press [▼] or [▲] repeatedly until the arrow points to “Program”.

3 Press [▶] (Yes key).

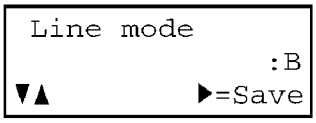
4 Press [▼] or [▲] repeatedly until the arrow points to “Set line mode”.



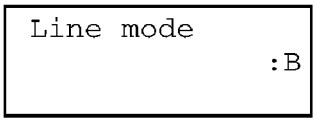

5 Press [▶] (Yes key).




6 Press [▼] or [▲] to select “B” or “A”.




7 Press [▶] (Save key).
- A beep sounds.
- To return to the standby mode, press [OFF].

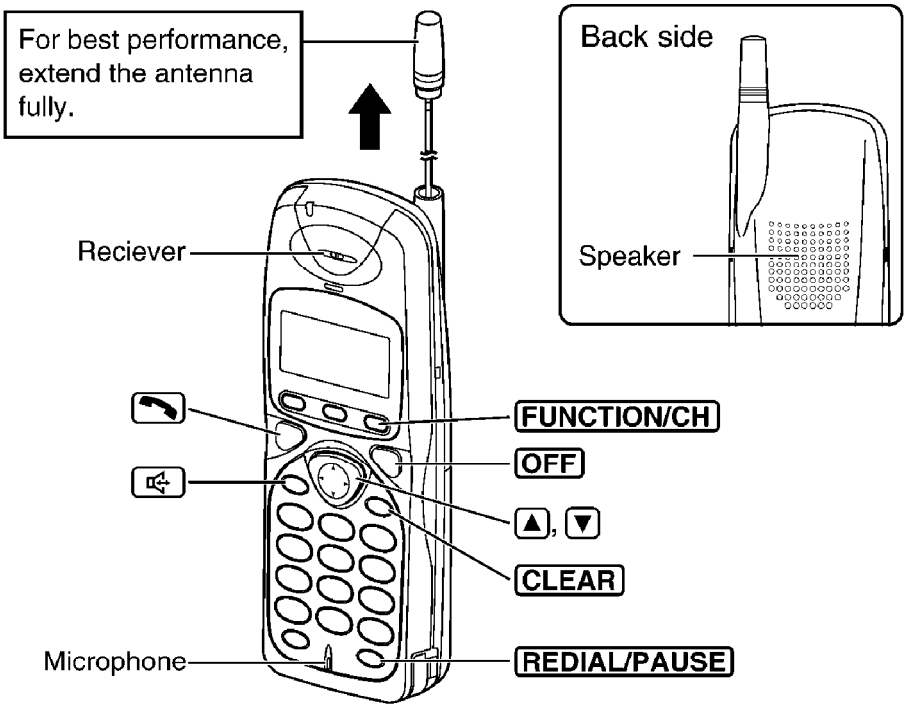



- You can exit the programming mode any time by pressing [OFF].
- If the handset has lost communication with the base unit, 3 beeps sound and “No link to base. Place on cradle and try again.” is displayed.

# 4. OPERATION

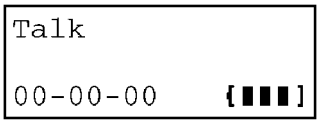
## 4.1. Making Calls

### 4.1.1. With the Handset

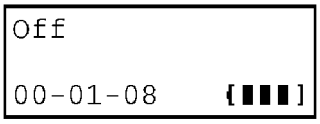



1 Press [phone].

2 Dial a phone number.
- The dialed number is displayed.
- After a few seconds, the display will show the length of the call and the battery strength.




3 To hang up, press OFF or place the handset on the base unit.



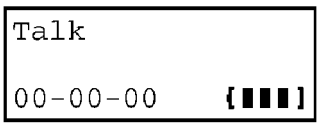

- If the handset has lost communication with the base unit, 3 beeps sound and "No link to base. Place on cradle and try again." is displayed.

## To have a hands-free phone conversation (Using Digital Duplex Speakerphone)

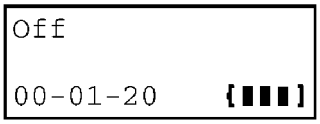
1 Press [speaker].
- The button lights.

2 Dial a phone number.
- The dialed number is displayed.
- After a few seconds, the display will show the length of the call and the battery strength.

3 When the other party answers, talk into the microphone.




4 To hang up, press [OFF] or place the handset on the base unit.
- The [speaker] button light goes out.



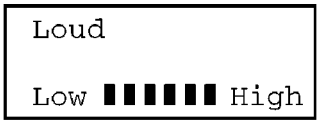

- If the handset has lost communication with the base unit, 3 beeps sound and "No link to base. Place on cradle and try again." is displayed.

**Hands-free Digital Duplex Speakerphone**
For best performance, please note the following:
- Talk alternately with the caller in a quiet room.
- If the other party has difficulty hearing you, press [▼] to decrease the speaker volume.
- If the other party's voice from the speaker cuts in/out during a conversation, press [▼] to decrease the speaker volume.
- While talking using [handset], you can switch to the hands-free phone conversation by pressing [speaker]. To switch back to the receiver, press [handset].

## To adjust the receiver volume (High, Medium or Low) or speaker volume (6 levels) while talking

To increase, press [▲].
To decrease press [▼].
- Each time you press [▼] or [▲], the volume level will change.
- The display will return to the length of the call.

Ex. Receiver volume: High
Speaker volume: level 6



### If noise interferes with the conversation

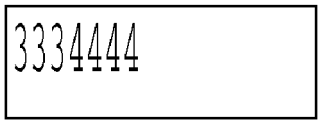
Extend the antenna fully, press FUNCTION/CH to select a clearer channel or move closer to the base unit.

### To redial the last number dialed on the handset

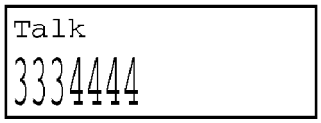
Press or and press REDIAL/PAUSE.

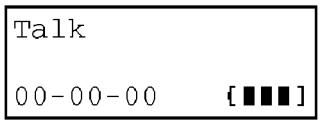
### To dial after confirming the entered number

1 Dial a phone number.
- If you misdial, press CLEAR and dial again.




2 Press .
OR
To have a hands-free phone conversation, press , and when the other party answers talk into the microphone.
- After a few seconds, the display will show the length of the call and the battery strength.




3 To hang up, press OFF or place the handset on the base unit.

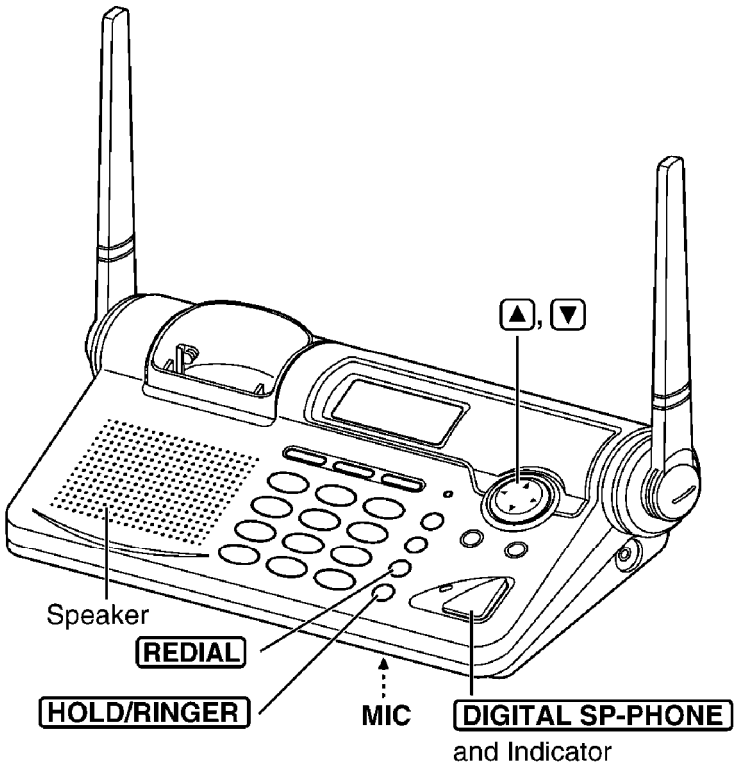
### To redial after confirming the last number dialed

Press REDIAL/PAUSE and press or .

### Lighted handset keypad

The handset dialing buttons will light when you press a button or lift the handset off the base unit, and flash when a call is received. The lights will go out about 10 seconds after pressing a button, lifting the handset or answering a call.

## 4.1.2. With the Base Unit (Digital Duplex Speakerphone)




1 Press **DIGITAL SP-PHONE**.
- The DIGITAL SP-PHONE indicator lights.

```
Talk
```

2 Dial a telephone number.

```
Talk
1112222
```

3 When the other party answers, talk into the **MIC** (microphone).

```
Talk
00-00-00
```

4 To hang up, press **DIGITAL SP-PHONE**.
- The indicator light goes out.

```
Off
00-00-00
```

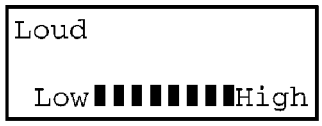
- To switch to the handset while using the base unit speakerphone:
  - If the handset is off the base unit, press [📞] or [🔊].
  - If on the base unit, just lift up.
- During a call using the handset, the call can be switched to the base unit speakerphone by pressing **DIGITAL SP-PHONE** on the base unit.

**Hands-free Digital Duplex Speakerphone**
For best performance, please note the following:
- Talk alternately with the caller in a quiet room.
- If the other party has difficulty hearing you, press ▲ to decrease the speaker volume.
- If the other party's voice from the speaker cuts in/out during a conversation, press ▼ to decrease the speaker volume.

### To adjust the speaker volume (8 levels) while talking

To increase, press ▲.
To decrease, press ▼.

Ex. Level 8




### To redial the last number dialed on the base unit

Press DIGITAL SP-PHONE and press REDIAL.

### To put a call on hold

Press HOLD.

- The DIGITAL SP-PHONE indicator flashes.

### To release the hold

From the base unit, press DIGITAL SP-PHONE.

From the handset, press or , or lift the handset off the base unit.

- If another phone is connected on the same line, you can also release the hold by lifting its handset.

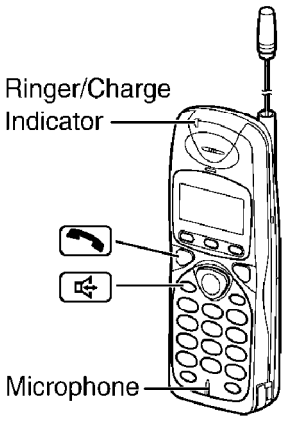
## 4.2. Answering Calls

When a call is received, the unit rings, "Incoming call" is displayed and the ringer/charge indicator flashes.
If you subscribe to a Caller ID service, the calling party information will be displayed after the first ring. In order to view the Caller ID information, please wait until the second ring to answer a call.

# With the Handset

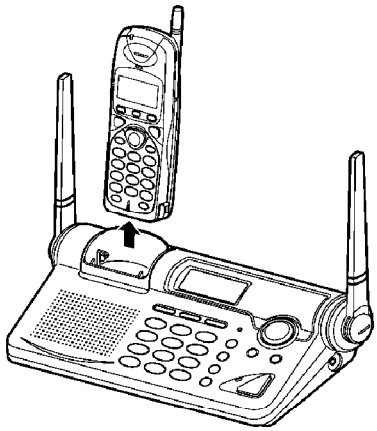
If the handset is off the base unit;
Press [📞].

•You can also answer a call by pressing any dialing button [0] to [9], [*] or [#] ( — **Any Key Talk**).
OR
Press [🔊], and when the other party answers talk into the microphone.




## Auto Talk

If you set the Auto Talk feature to ON, you can answer a call by lifting the handset off the base unit without pressing [📞] or [🔊].

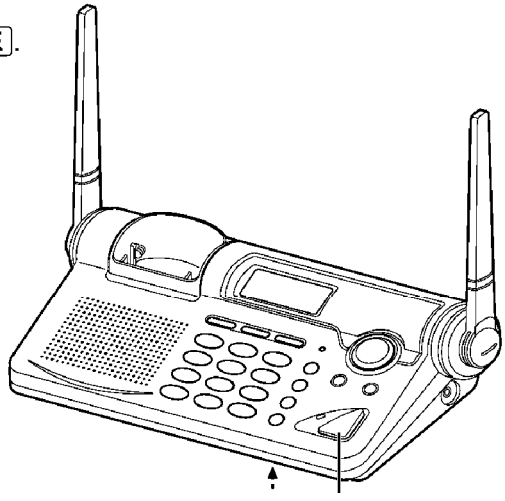


# With the Base Unit

1 Press [DIGITAL SP-PHONE].

2 Talk into the **MIC**.

3 To hang up, press [DIGITAL SP-PHONE].



MIC DIGITAL SP-PHONE

## 4.3. Flash Button

Pressing FLASH/CALL WAIT allows you to use special features of your host PBX such as transferring an extension call or accessing special telephone services (optional) such as call waiting.

### Selecting the flash time

The flash time depends on your telephone exchange or host PBX. You can select the following flash times: "700, 600, 400, 300, 250, 110, 100 or 90 ms (milliseconds)". Your phone comes from the factory set to "700 ms".

**Make sure the unit is in the standby mode initially.**

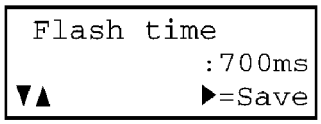
1 Press FUNCTION/CH.

2 Press ▼ or ▲ repeatedly until the arrow points to "Program".

3 Press ▶ (Yes key).

4 Press ▼ or ▲ repeatedly until the arrow points to "Set flash time".

5 Press ▶ (Yes key).




6 Press ▼ or ▲ repeatedly until the desired time is displayed, and press ▶ (Save key).
- A beep sounds.
- To return to the standby mode, press OFF.

- You can exit the programming mode any time by pressing OFF.
- If you are connected via a PBX, a longer flash time may be necessary to use PBX functions (transferring a call etc.). Consult your PBX supplier for the correct setting.

## 4.4. Caller ID Service

**This unit is compatible with a Caller ID service offered by your telephone company. If you subscribe to a Caller ID service, the calling party's information will be shown on the handset and base unit displays after the first ring.**

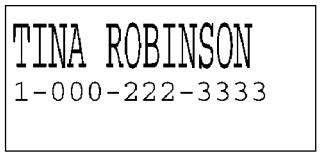
**The unit can record information of up to 50 different callers in the Caller List. The Caller List information is sorted by the most recent to the oldest call. When the 51st call is received, the first call is deleted.**

**Using the list, you can automatically call back a caller. You can store the callers' names and**

**numbers from the Caller List into the directory.**
**If you subscribe to both Caller ID and Call Waiting services, when a second call is received while talking, the new caller's name and phone number will be displayed.**

### 4.4.1. How caller information is displayed when a call is received

The handset and base unit displays show the caller's name and number after the first ring.




- After you answer the call, the display will show the length of the call.

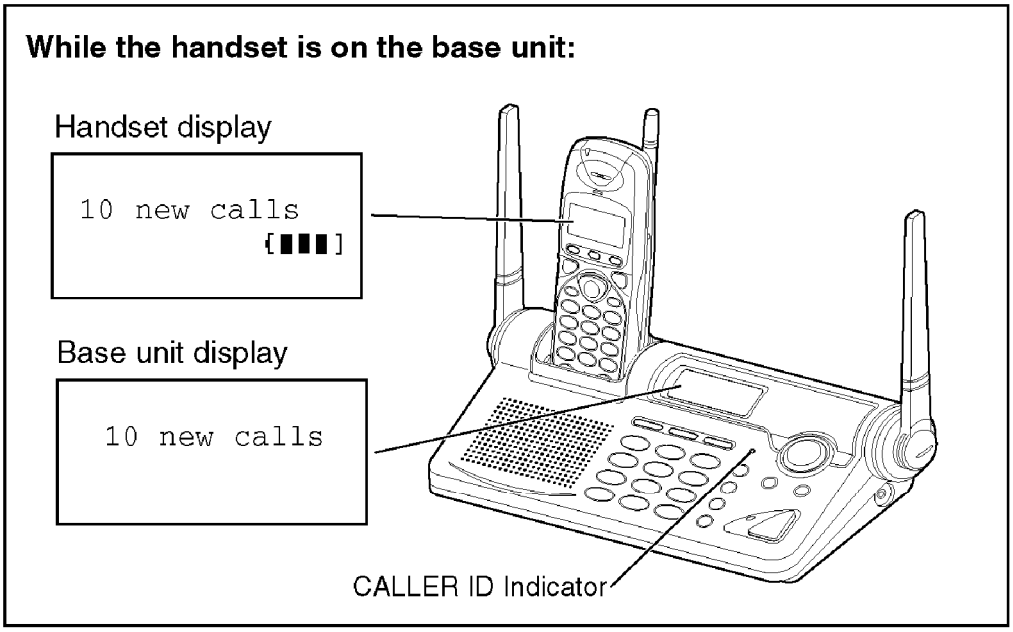
- Caller information cannot be displayed in the following cases:
  —If the caller dialed from an area which does not provide a Caller ID service, the display will show "Out of area".
  —If the caller has requested not to display his/her information, the display will show "Private caller".
- If your unit is connected to a PBX which does not support Caller ID services, you cannot access those services.
- The name display service may not be available in some areas. For further information, please contact your telephone company.

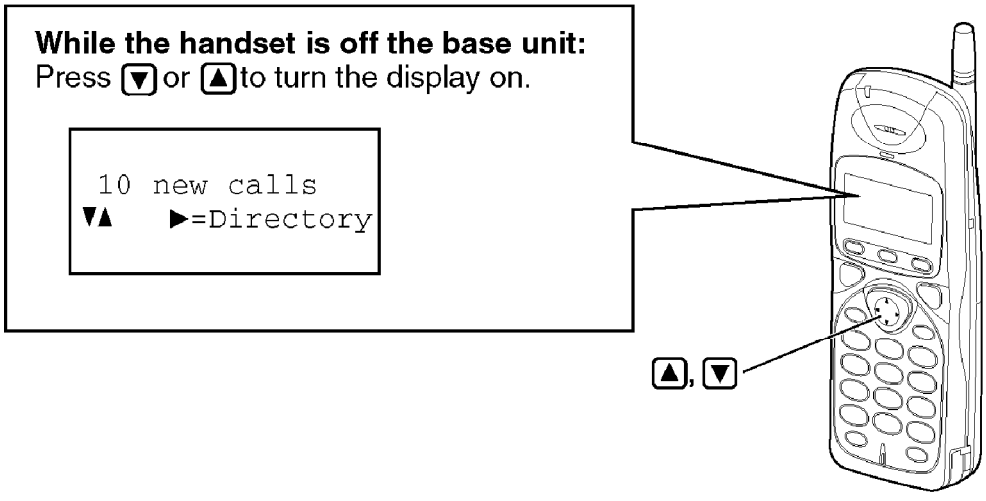
**Call group feature (Dual-Color Visual Ringer):**
If you receive a caller ID call from one of the phone numbers stored in the directory and the item has set the feature;
– the handset and base unit will ring with a different ringer pattern,
– the handset and base unit displays will light in orange, and
– the ringer/charge indicator will flash in orange.
You can then distinguish the caller from others easily. To use this feature, store items in the directory and turn the feature on for required items.

### 4.4.2. To check the number of new calls

When new calls have been received, the CALLER ID indicator flashes on the base unit. The handset and base unit displays show the number of new calls.

**Ex. You have received 10 new calls.**




•If "No items stored" is displayed, the Caller List is empty.

### 4.4.3. Viewing the Caller List

You can view the caller list with the handset or the base unit. Caller List information includes the caller's name and phone number, the time and date the call was received, and the number of times that caller called.
**Make sure the unit is in the standby mode initially.**

## With the handset

1 Press ▼ or ▲ to enter the Caller List.

- The display will show, for example, the following.

```
  2 new calls
▼▲   ▶=Directory
```

- You can go to the directory list by pressing ▶.

2 To search from the most recent call, press ▼.
To search from the oldest call, press ▲.

- To scroll between callers, press ▼ or ▲.

```
JACK SMITH
1-222-333-4444
 3:10P JUN.10
```

3 To exit the list, press **OFF**.

- The handset will return to the standby mode.

## With the base unit

1 Press ▼ or ▲ to enter the Caller List.

- The display will show, for example, the following.

```
  2 new calls
▼▲   ▶=Directory
```

- You can go to the directory list by pressing ▶.

2 To search from the most recent call, press ▼.
To search from the oldest call, press ▲.

- To scroll between callers, press ▼ or ▲.

```
JACK SMITH
1-222-333-4444
 3:10P JUN.10
```

3 To exit the list, press **EXIT**.

- The base unit will return to the standby mode.

- If "No items stored" is displayed, the Caller List is empty.
- If there is no name information for a caller, the display will only show the phone number.
- While you are viewing the Caller List with the handset, another person cannot access the list using the base unit, and vice versa.

## What "√" means

When the display shows "√", you have already viewed this calling information, answered the call or called back the caller. If the same caller calls again, the call entry with "√" will be replaced with the new call entry.

```
JACK SMITH
1-222-333-4444
 3:10P JUN.10 √
```

## If a caller calls more than once

The number of times the same caller called is displayed (×2 to ×9). The date and time of the most recent call will be recorded. After

```
JACK SMITH
1-222-333-4444
 3:10P JUN.10 ×3
```

checking, X2 to X9 will be replaced with "√".

### 4.4.4. Calling Back from the Caller List

#### With the handset

1 Press ▼ or ▲ to enter the Caller List.

```
  3 new calls
▼▲   ▶=Directory
```

2 To search from the most recent call, press ▼.
To search from the oldest call, press ▲.

```
CINDY TURNER
1-234-456-7890
11:20A JAN.12 X3
```

3 Press 📞 or 🔊.
- The displayed phone number is dialed automatically.

```
Talk
12344567890
```

#### With the base unit

1 Press ▼ or ▲ to enter the Caller List.

```
  3 new calls
▼▲   ▶=Directory
```

2 To search from the most recent call, press ▼.
To search from the oldest call, press ▲.

```
CINDY TURNER
1-234-456-7890
11:20A JAN.12 X3
```

3 Press DIGITAL SP-PHONE.
- The displayed phone number is dialed automatically.

```
Talk
12344567890
```

- In some cases, you may have to edit the number before dialing. (Ex. You may have to delete "1" and the area code.)
- If a phone number is not displayed in the caller information, you cannot call back that caller.

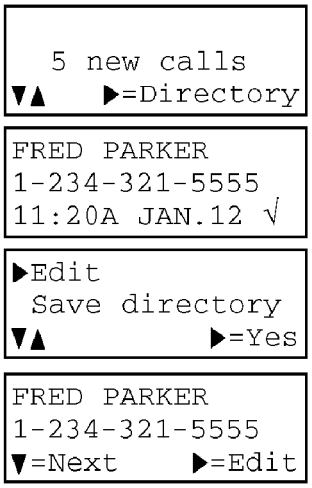
### 4.4.5. Editing the Caller's Phone Number

You can edit a phone number into one of 4 patterns using the handset or the base unit.
**Make sure the unit is in the standby mode initially.**

#### 4.4.5.1. With the handset

1 Press ▼ or ▲ to enter the Caller List.

2 Press ▼ or ▲ repeatedly to find the desired caller, and press ▶.




3 While the arrow points to "Edit", press ▶ (Yes key).

4 Press ▶ (Edit key) to select a pattern.

- Each time you press ▶, the number is rearranged into one of 4 different patterns.

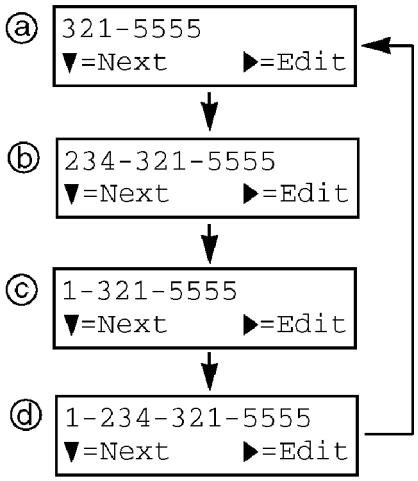
ⓐ [Phone no.]

ⓑ [Area code] – [Phone no.]

ⓒ 1 – [Phone no.]

ⓓ 1 – [Area code] – [Phone no.]

- The order in which patterns ⓐ – ⓓ are displayed depends on how the telephone number is displayed in step 3.



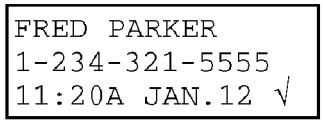

5 After editing the number, you can continue with calling back or storing procedures. To call back, press [phone] or [speaker].
To store the number in the directory, press ▼ (Next key), and follow the instructions on the display.

- The number edited in step 4 will not be maintained in the Caller List.

#### 4.4.5.2. With the base unit

1 Press ▼ or ▲ to enter the Caller List.

2 Press ▼ or ▲ repeatedly to find the desired caller.




3 Press EDIT to select a pattern.

•Each time you press EDIT, the number is rearranged into one of 4 different patterns.

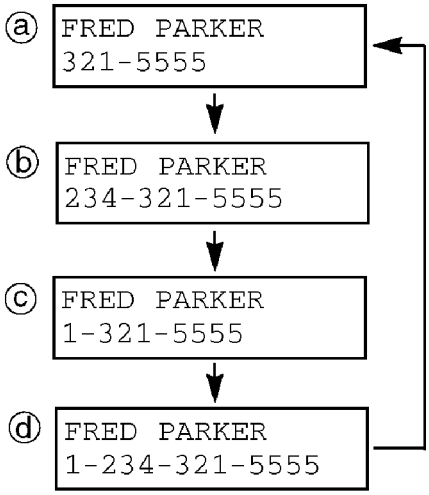
ⓐ Phone no.

ⓑ Area code – Phone no.

ⓒ 1 – Phone no.

ⓓ 1 – Area code – Phone no.

•The order in which patterns ⓐ–ⓓ are displayed depends on how the telephone number is displayed in step 2.




4 After editing the number, you can continue with calling back. Press DIGITAL SP-PHONE.

•The number edited in step 3 will not be maintained in the Caller List.

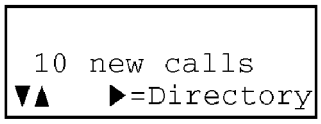
### 4.4.6. Storing Caller List Information in the Directory

You can store names and phone numbers that are in the Caller List into the directory. You can also turn the call group feature on for certain callers.

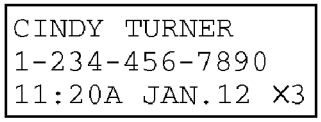
**Storing must be carried out with the handset.**

**Make sure the unit is in the standby mode initially.**

1 Press ▼ or ▲ to enter the Caller List.




2 Press ▼ or ▲ repeatedly to find the caller you want to store in the directory, and press ▶ (Yes key).

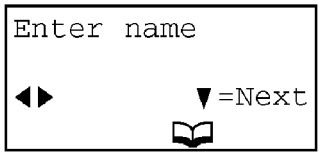


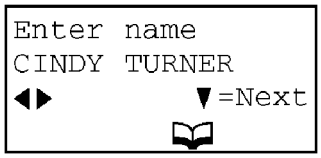
3 Press ▼ or ▲ to select "Save directory", and press ▶ (Yes key).

**If there is no name information for the caller, "Enter name" will be displayed.**

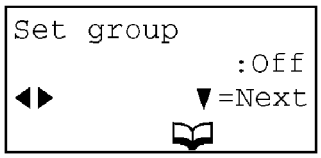
a) If a name is not required, press ▼ (Next key) twice.

b) If a name is required, enter the name. When finished, press ▼ (Next key) twice.




4 To turn the call group feature on, select "On" by pressing ◀ or ▶.
If not required, select "Off".




- You can exit the programming mode any time by pressing OFF.
- If the display shows "Directory full" in step 3, press OFF to exit the list.
- You cannot store caller information in the directory if a phone number is not displayed.
- If 3 beeps sound and the display shows "Save error", move closer to the base unit and start again from step 1.

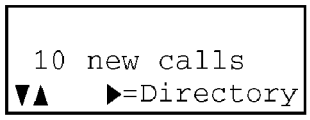
### 4.4.7. Erasing Caller List Information

After checking the Caller List, you can erase some or all of the entries with the handset or the base unit.
**Make sure the unit is in the standby mode initially.**

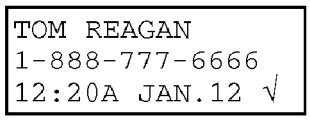
## To erase a specific caller from the Caller List

**With the handset/base unit:**

1 Press ▼ or ▲ to enter the Caller List.




2 Press ▼ or ▲ repeatedly to find the caller you want to erase from the Caller List.




3 If using the handset, press **CLEAR/INTERCOM**.
OR
If using the base unit, press **CLEAR**.

- A beep sounds and the information is erased.
- To erase other items, repeat from step 2.
- To return to the standby mode, if using the handset, press **OFF**. If using the base unit, press **EXIT**.

## To erase all entries in the Caller List

Before erasing all entries, make sure that "0 new call" is displayed.

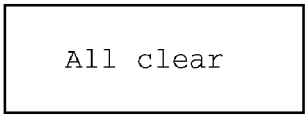
**With the handset/base unit:**

1 Press ▼ or ▲ to enter the Caller List.

2 If using the handset, press **CLEAR/INTERCOM**.
OR
If using the base unit, press **CLEAR**.

3 Press ▼ or ▲ to select "All clear".

4 Press ▶ (Yes key).




- A beep sounds and all entries are erased.

# 5. DISASSEMBLY INSTRUCTIONS

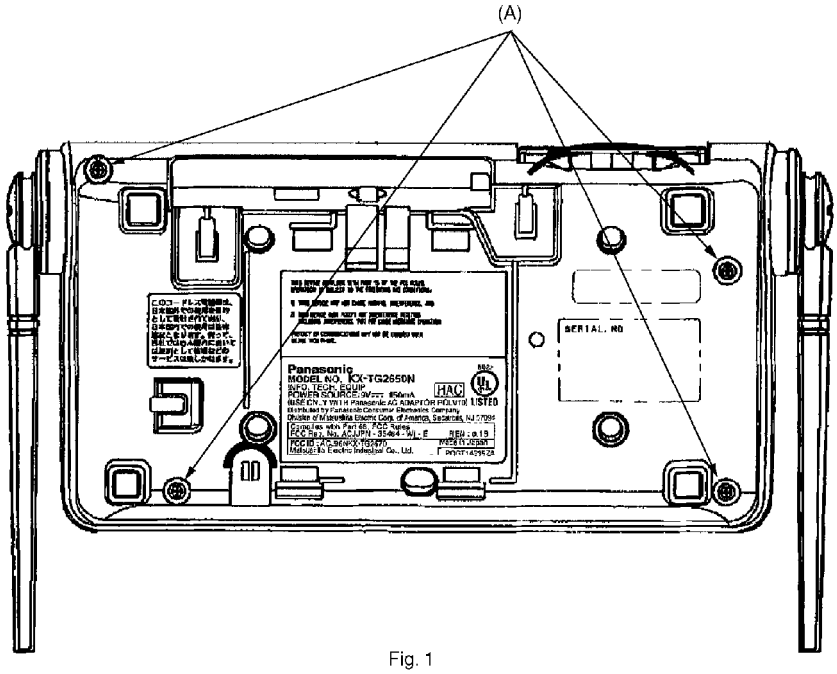

(A)
SERIAL NO.
Panasonic
MODEL NO. KX-TG2650N

Fig. 1

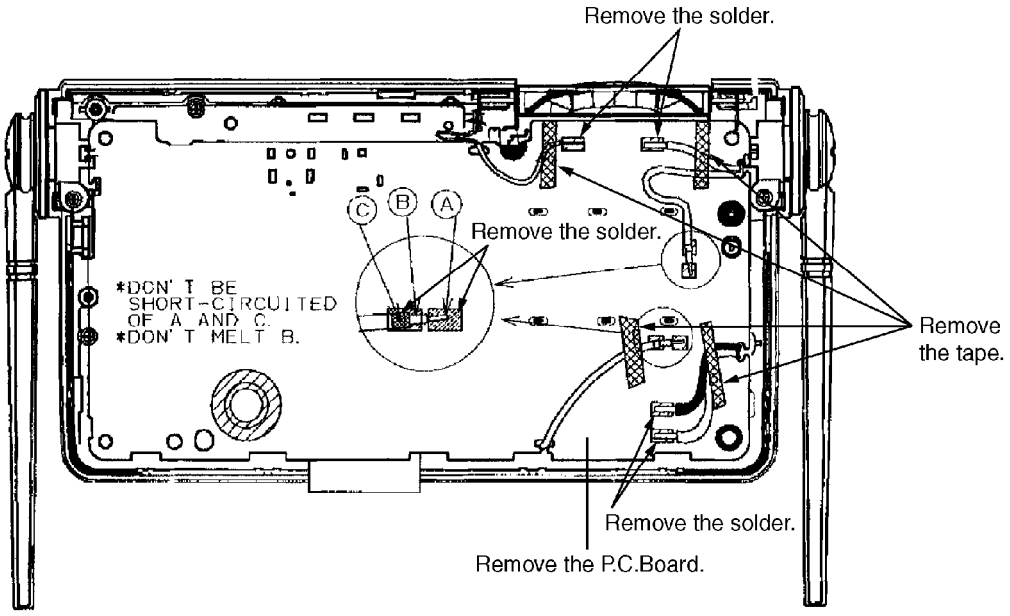

Remove the solder.
C
B
A
Remove the solder.
*DON'T BE
SHORT-CIRCUITED
OF A AND C.
*DON'T MELT B.
Remove
the tape.
Remove the solder.
Remove the P.C.Board.

Fig. 2

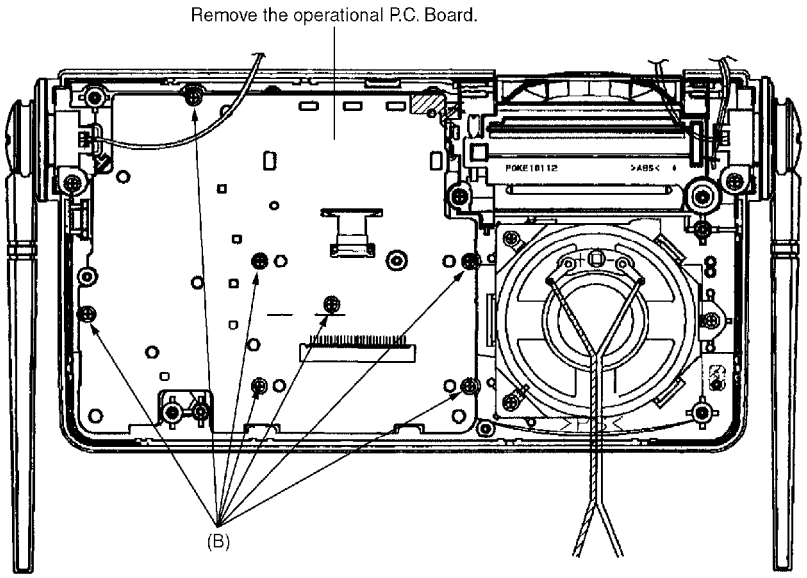



Fig. 3

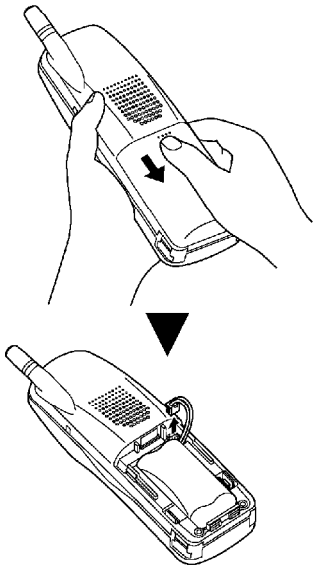


Fig. 4

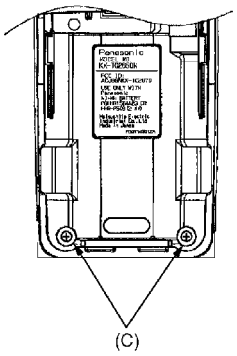



Fig. 5

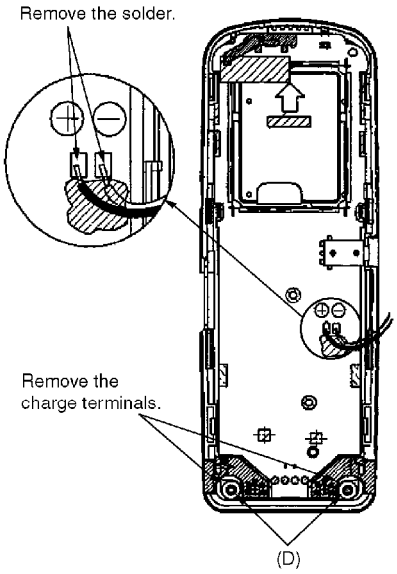
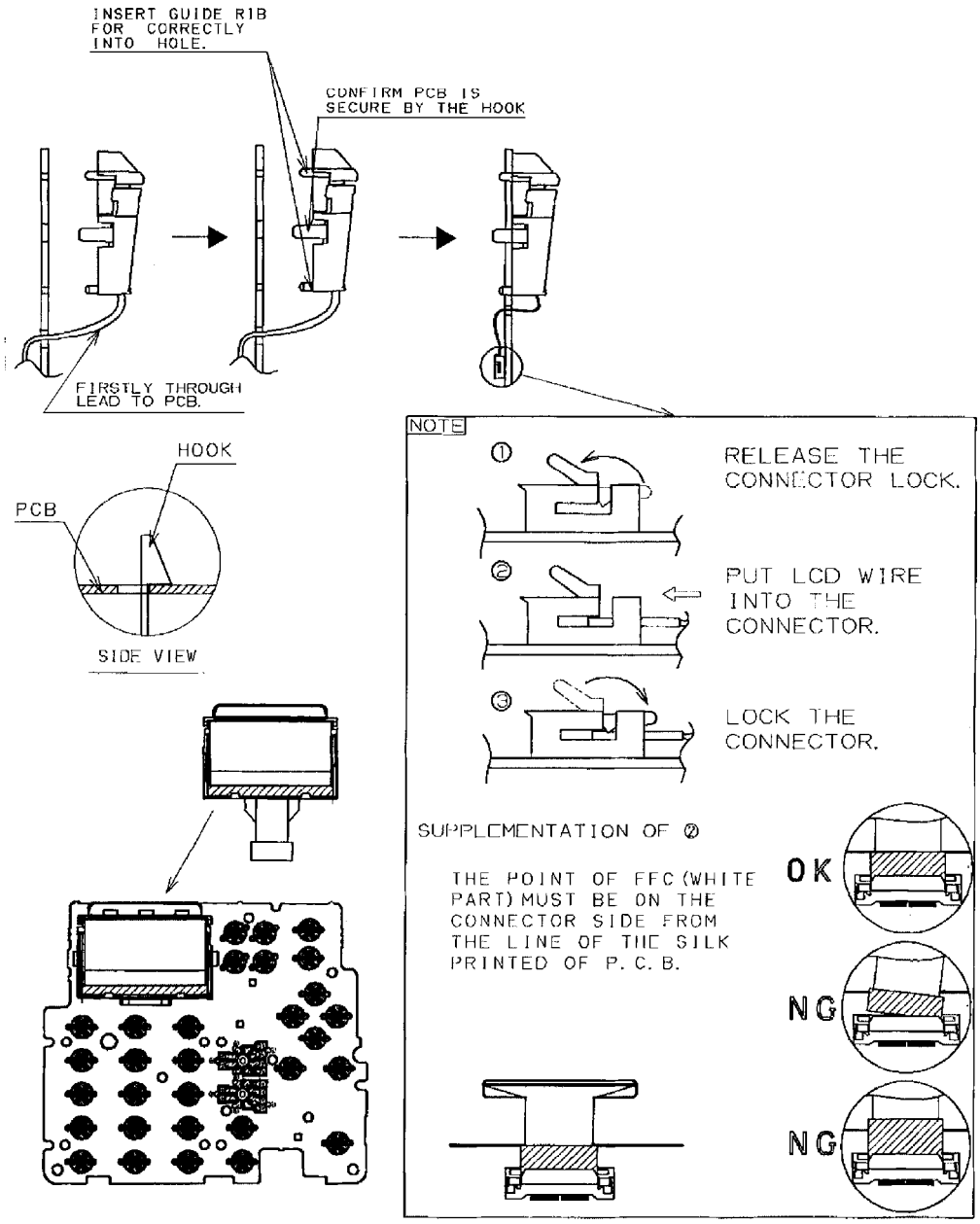



Fig. 6

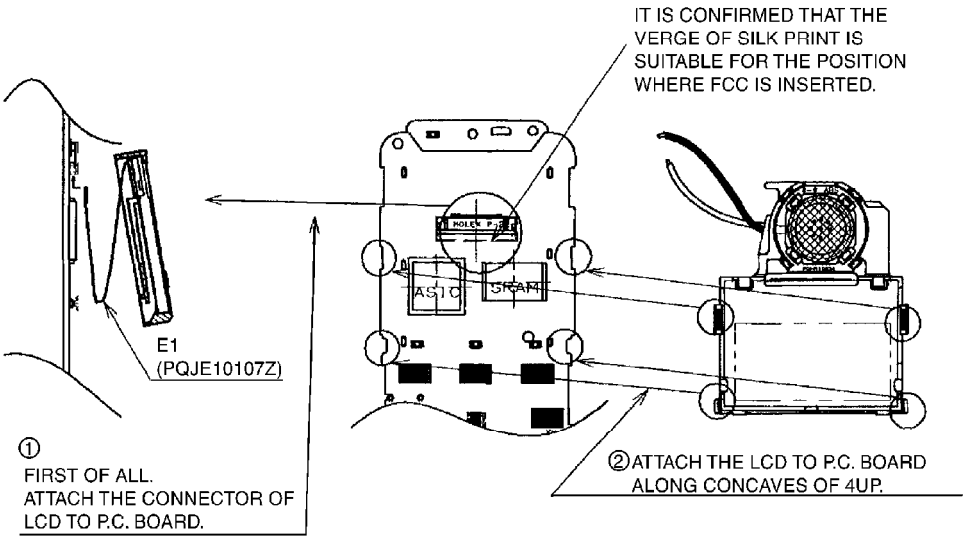
| Shown in Fig.- | To Remove | Remove |
|---|---|---|
| 1 | Lower Cabinet | Screws (2.6 × 14) × 4 |
| 2 | Main P.C. Board | Remove the P.C. Board |
| 3 | Operational P.C. Board | Screws (2.6 × 8) × 7 |
| 4 | Battery Cover | Remove the Battery Cover |
| 5 | Rear Cabinet | Screws (2 × 8) × 2 |
| 6 | Main P.C. Board | Remove the P.C. Board |

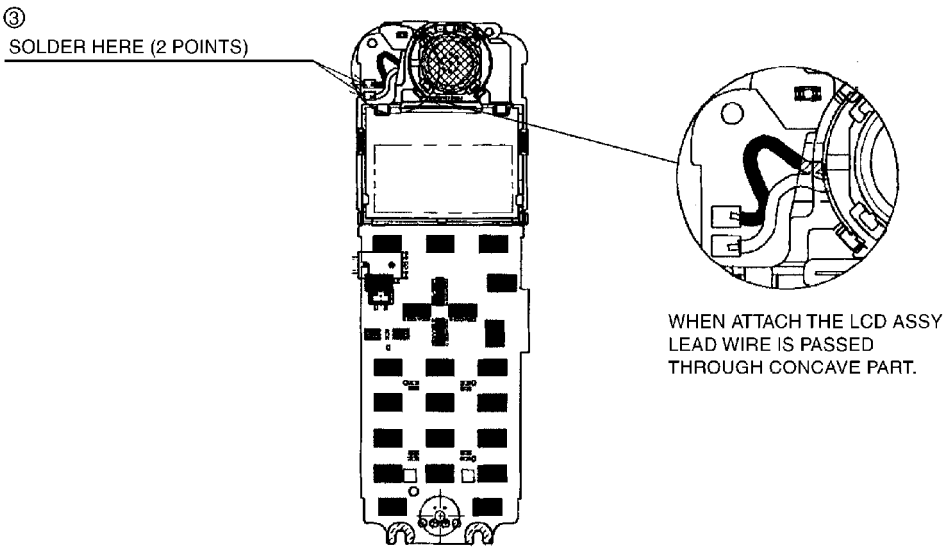
# 6. ASSEMBLY INSTRUCTIONS

## 6.1. Assembly the LCD to P.C. Board (Base Unit)


INSERT GUIDE RIB FOR CORRECTLY INTO HOLE.
CONFIRM PCB IS SECURE BY THE HOOK
FIRSTLY THROUGH LEAD TO PCB.
HOOK
PCB
SIDE VIEW
NOTE
RELEASE THE CONNECTOR LOCK.
PUT LCD WIRE INTO THE CONNECTOR.
LOCK THE CONNECTOR.
SUPPLEMENTATION OF ②
THE POINT OF FFC (WHITE PART) MUST BE ON THE CONNECTOR SIDE FROM THE LINE OF THE SILK PRINTED OF P. C. B.
OK
NG
NG

## 6.2. Assembly the LCD to P.C. Board (Handset)



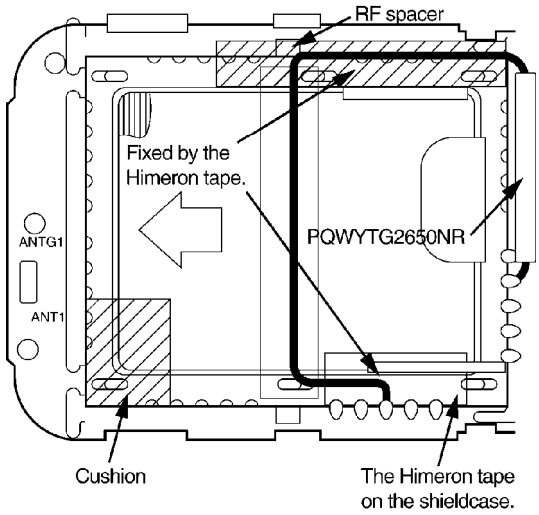

## 6.3. Replace the RF unit

**For HS**

**Follow this procedure below when replacing HS RF(*1) unit.**

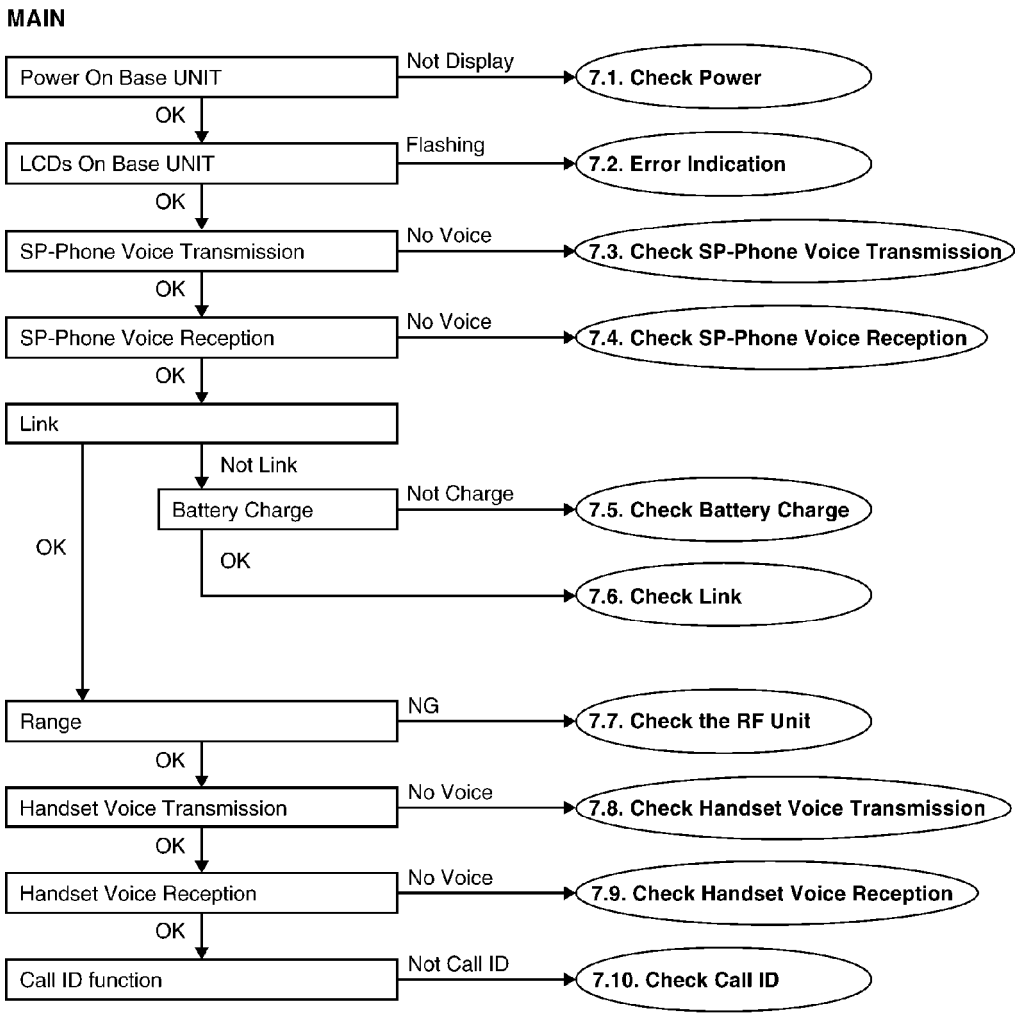
1. **Remove speaker cables of LCD unit on HS main board. / And remove LCD unit.**
2. **Remove solder on six legs of RF unit.**
3. **Take tape off on wire.**
4. **Remove Capacitor with wire on RF unit.**
5. **Take tape off on RF shield case.**
6. **Remove solder on all pads of RF unit.**

7. Replace defective RF unit with new HS RF unit.
   NOTE:
   Do not use BU RF unit for HS one.
   HS RF unit is different from BU one.
8. Solder all pads of RF unit.
9. Stick tape on RF pads like figure below.
10. Put and solder a capacitor with wire at specified pads / [See CIRCUIT BOARD (Handset) ].
11. Stick tape on wire.
12. Solder six Rf legs.
13. Put LCD unit and solder speaker wire.
    NOTE:
    Speaker wire has polarity.




(*) HS RF Service Parts No. PQWPTG2650KT. (RF BLOCK KIT)

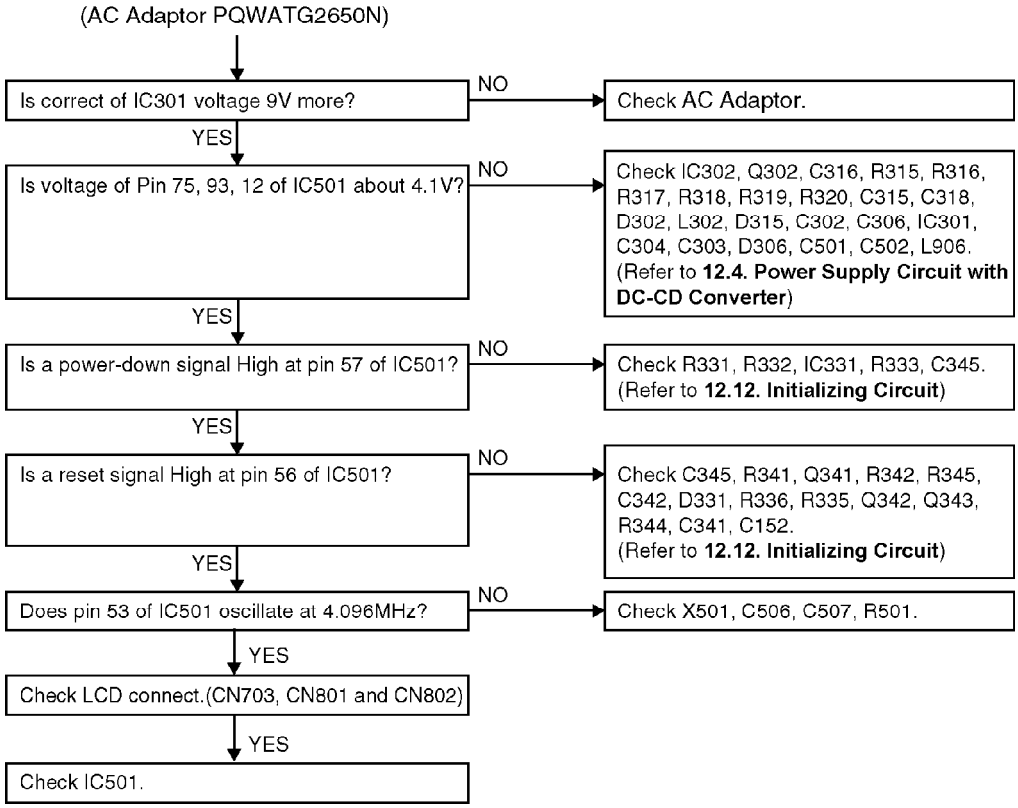
# 7. TROUBLESHOOTING GUIDE




## 7.1. Check Power

**BASE UNIT**

Is the AC Adaptor inserted into 120V outlet?

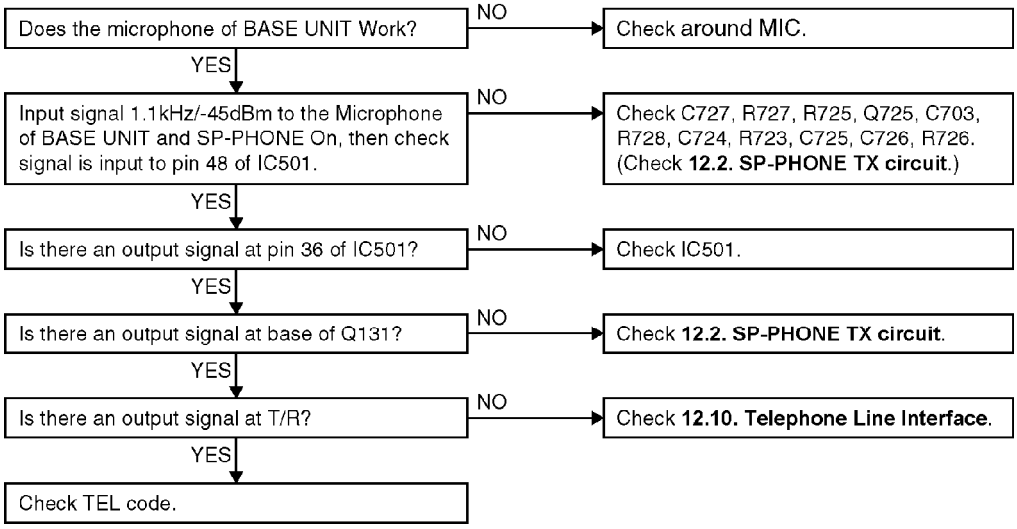

(AC Adaptor PQWATG2650N)
Is correct of IC301 voltage 9V more?
NO
Check AC Adaptor.
YES
Is voltage of Pin 75, 93, 12 of IC501 about 4.1V?
NO
Check IC302, Q302, C316, R315, R316, R317, R318, R319, R320, C315, C318, D302, L302, D315, C302, C306, IC301, C304, C303, D306, C501, C502, L906. (Refer to 12.4. Power Supply Circuit with DC-CD Converter)
YES
Is a power-down signal High at pin 57 of IC501?
NO
Check R331, R332, IC331, R333, C345. (Refer to 12.12. Initializing Circuit)
YES
Is a reset signal High at pin 56 of IC501?
NO
Check C345, R341, Q341, R342, R345, C342, D331, R336, R335, Q342, Q343, R344, C341, C152. (Refer to 12.12. Initializing Circuit)
YES
Does pin 53 of IC501 oscillate at 4.096MHz?
NO
Check X501, C506, C507, R501.
YES
Check LCD connect.(CN703, CN801 and CN802)
YES
Check IC501.

## 7.2. Error Indication

| Symptom | Remedy |
|---|---|
| The Flash Memory (IC751) is defective when all LED's of the base unit flash. | 1. Confirm Flash Memory is equipped.<br>2. Confirm the connection of Flash Memory.<br>3. Confirm the power supply of Flash Memory.<br>When no error is found in above-mentioned items,<br>Flash Memory has a defect. Replace Flash Memory. |

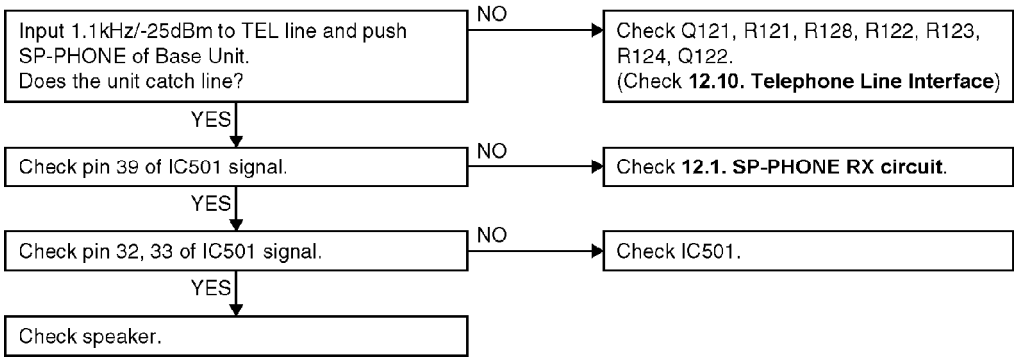
## 7.3. Check SP-Phone Voice Transmission

**BASE UNIT**

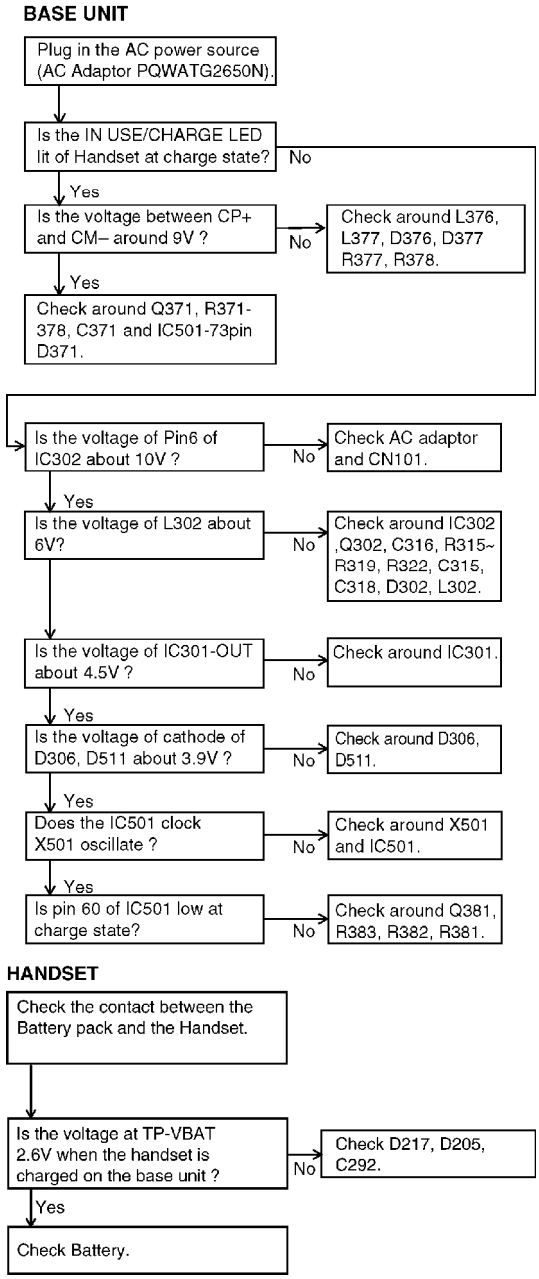

Does the microphone of BASE UNIT Work?
NO
Check around MIC.
YES
Input signal 1.1kHz/-45dBm to the Microphone of BASE UNIT and SP-PHONE On, then check signal is input to pin 48 of IC501.
NO
Check C727, R727, R725, Q725, C703, R728, C724, R723, C725, C726, R726. (Check 12.2. SP-PHONE TX circuit.)
YES
Is there an output signal at pin 36 of IC501?
NO
Check IC501.
YES
Is there an output signal at base of Q131?
NO
Check 12.2. SP-PHONE TX circuit.
YES
Is there an output signal at T/R?
NO
Check 12.10. Telephone Line Interface.
YES
Check TEL code.

## 7.4. Check SP-Phone Voice Reception

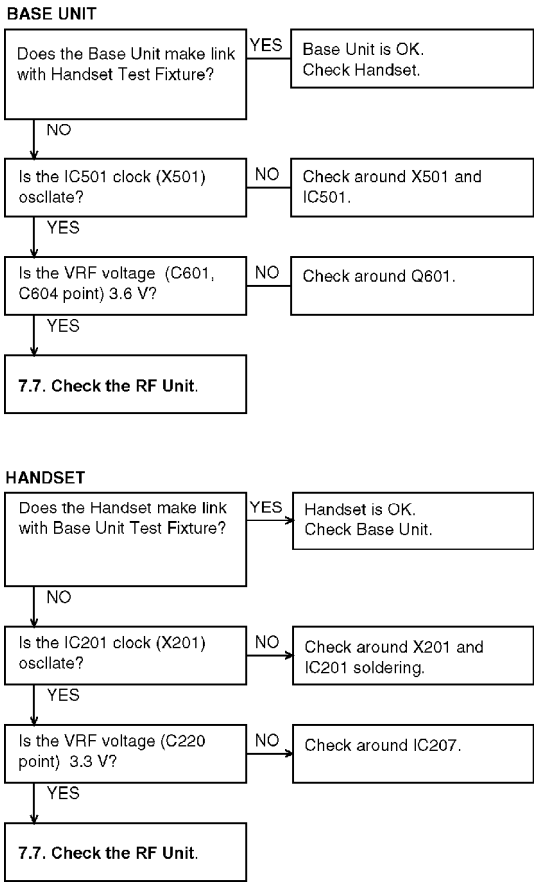
**BASE UNIT**




## 7.5. Check Battery Charge


BASE UNIT
Plug in the AC power source (AC Adaptor PQWATG2650N).
Is the IN USE/CHARGE LED lit of Handset at charge state?
No
Yes
Is the voltage between CP+ and CM– around 9V ?
No
Check around L376, L377, D376, D377 R377, R378.
Yes
Check around Q371, R371-378, C371 and IC501-73pin D371.
Is the voltage of Pin6 of IC302 about 10V ?
No
Check AC adaptor and CN101.
Yes
Is the voltage of L302 about 6V?
No
Check around IC302 ,Q302, C316, R315~R319, R322, C315, C318, D302, L302.
Is the voltage of IC301-OUT about 4.5V ?
No
Check around IC301.
Yes
Is the voltage of cathode of D306, D511 about 3.9V ?
No
Check around D306, D511.
Yes
Does the IC501 clock X501 oscillate ?
No
Check around X501 and IC501.
Yes
Is pin 60 of IC501 low at charge state?
No
Check around Q381, R383, R382, R381.
HANDSET
Check the contact between the Battery pack and the Handset.
Is the voltage at TP-VBAT 2.6V when the handset is charged on the base unit ?
No
Check D217, D205, C292.
Yes
Check Battery.

## 7.6. Check Link




# 7.7. Check the RF Unit

## 7.7.1. Finding out the Defective Unit

**Prepare HS Test Fixture and BU Test Fixture. Place the HS Test Fixture on the cradle of the base unit for checking, then confirm that they are linked. Place the handset for checking on the cradle of the BU Test Fixture, then confirm that they are linked. How to confirm the link is as follows; press the TALK button and confirm Handset in use is displayed on BU LCD.**

## 7.7.2. Check Items

**The headset Jack has been wired as a switch to control Normal and Test modes on this "HS Test Fixture".**

### 7.7.2.1. Handset Test Fixture for Base Unit

**Test Fixture has two mode.**

1. **TEST mode:**
   **Use test fixture without headset plug inserted. / Then Test fixture is in TEST mode.**
2. **Normal mode:**
   **Plug headset plug into headset jack. / Then Test fixture is in Normal mode.**

**NOTE:**

**Audio is coming from Receiver whether headset plug is inserted or**

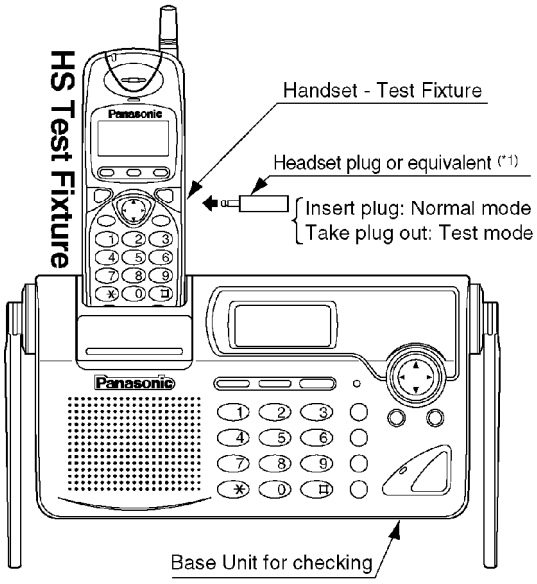
**not.**

**This test simulates the handset is at very large distance from the base unit and the TX signal from handset to base is very small.**

**Procedure: First place handset Test Fixture on base under test to charge (exchange security code); then remove handset from base after you hear beep; then press TALK to operate. The LCD will show TALK. This means that the base unit sensitivity is OK.**

**NOTE:**

**1) Only KX-TG2650N with marks HS Test Fixture can be used for troubleshooting. Regular KX-TG2650N production samples does not have the software needed for troubleshooting.**


HS Test Fixture
Handset - Test Fixture
Headset plug or equivalent (*1)
Insert plug: Normal mode
Take plug out: Test mode
Base Unit for checking

### 7.7.2.2. Base Unit Test Fixture for Handset

**The headset Jack has been wired as a switch to control Normal and Test modes on this "BU Test Fixture".**

**Test Fixture has two mode.**

1. **TEST mode:**
   **Use test fixture without headset plug inserted. / Then Test fixture is in TEST mode.**
2. **Normal mode:**
   **Plug headset plug into headset jack. / Then Test fixture is in Normal mode.**

**NOTE:**

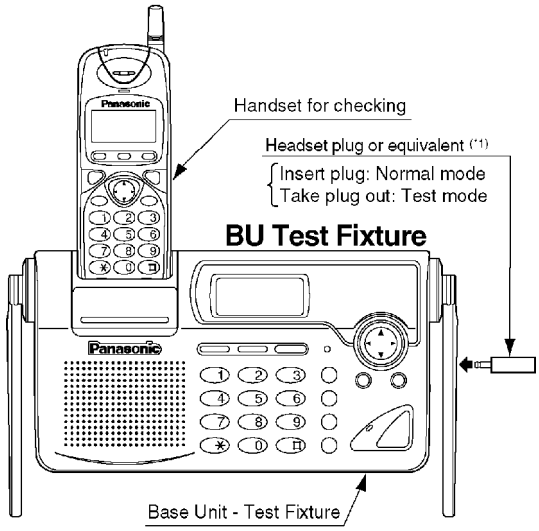
**Audio is coming from Receiver whether headset plug is inserted or not.**

**This test simulates the handset is at very large distance from the base unit and the TX signal from base to handset is very small.**

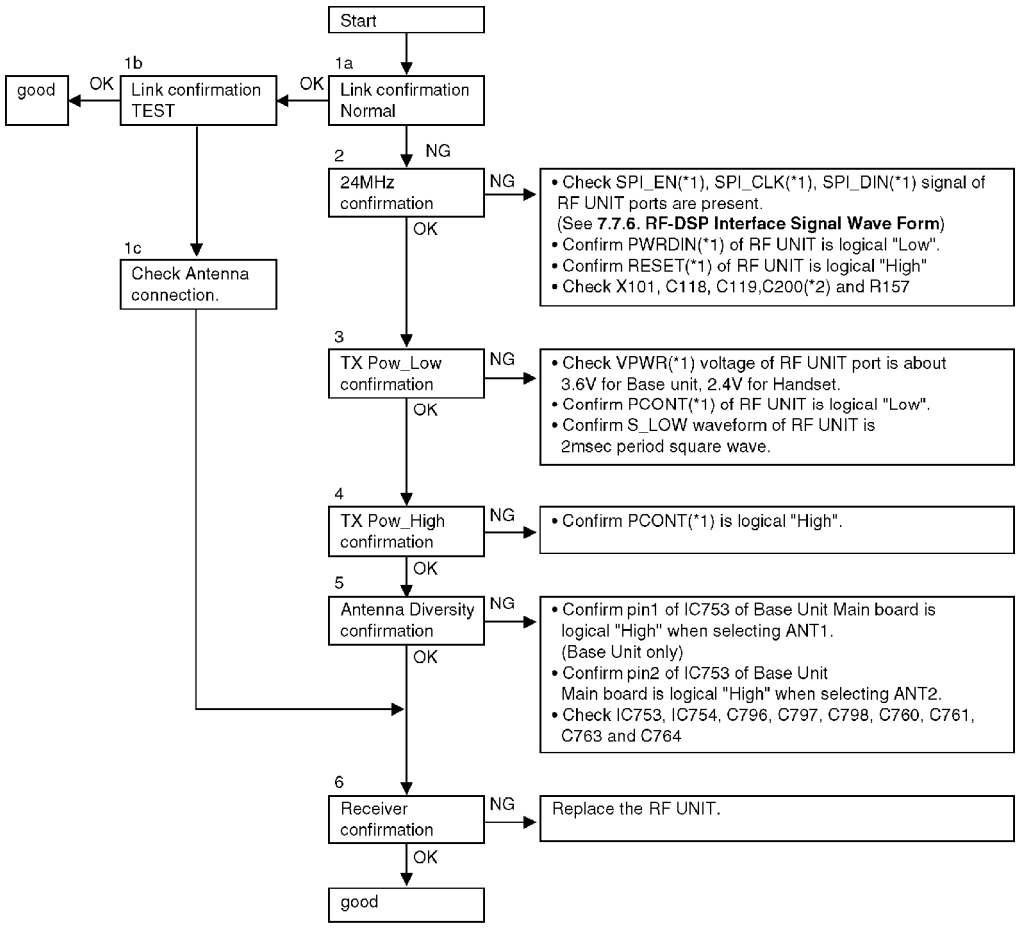
**Procedure: First, place handset under test to charge (exchange security code), then remove handset from base after you hear a beep. Press TALK button on handset and if it links with the**

**base, then this handset sensitivity is OK.**

**NOTE:**
**1) Only KX-TG2650N with marks BU Test Fixture can be used for troubleshooting. Regular KX-TG2650N production samples does not have the software needed for troubleshooting.**


Handset for checking
Headset plug or equivalent (*1)
Insert plug: Normal mode
Take plug out: Test mode
BU Test Fixture
Base Unit - Test Fixture

## 7.7.3. RF Check Flowchart




(*1) See **24.1 RF Unit Reference Drawing**
(*2) Base unit RF only

## 7.7.4. Check Table for RF Block

| No. | Item | BU (Base unit) (*1) | HS (Handset) (*1) |
|---|---|---|---|
| 1a | Link confirmation Normal | 1. Insert headset plug to headset jack of "HS Test Fixture". / 2. Press [TALK] key of "HS Test Fixture" to establish link about one foot (30cm) away from "Base unit". / 3. Confirm to link. | 1. Insert headset plug to head of "BU Test Fixture". / 2. Pres key of "Handset" to establish about one foot (30cm) away fı Test Fixture". / 3. Confirm to l |
| 1b | Link confirmation Test | 1. Take headset plug off from headset jack of "HS Test Fixture". / 2. Press [TALK] key of "HS Test Fixture" to establish link about one foot (30cm) away from "Base unit". / 3. Confirm to link. | 1. Take headset plug off from jack of "BU Test Fixture". / 2. [TALK] key of "Handset" to es link about one foot (30cm) aw "BU Test Fixture". / 3. Confirn |
| 1c | Check Antenna connection | 1. Check ANT1(*2) and ANT2(*2) soldering. / 2. Check ANT1(*2) and ANT2(*2) points are shorted to GND. | 1. Check Antenna (*3) on HS r board soldering. / 2. Check ex Antenna of HS cabinet. |
| 2 | 24MHz confirmation | 1. Set BU to [Test STANDBY] mode (*5) / 2. Confirm X101 frequency within 24 MHz ±720 Hz at TP_FREQ (*4) of RF Unit. | 1. Set HS to [Test STANDBY] / 2. Confirm X101 frequency w MHz ±720 Hz at TP_FREQ (*4) Unit. |
| 3 | TX Pow_Low confirmation | 1. Put wire to ANT1 (*2) and GND (*2) / 2. Connect this wire to Spectrum analyzer or Marconi. / 3. Set BU to [Low Power] mode (*5) 4. Confirm TX power level within -5 ~ +10 dBm (*6) | 1. Remove Antenna on HS ma Put wire to ANT (*3) and GND Connect this wire to Spectrun analyzer or Marconi. / 3. Set H Power] mode (*5) / 4. Confirm power level within -5 ~ +10dB |
| 4 | TX Pow_High confirmation | 5. Set BU to [High Power] mode (*5) / 6. Confirm TX power level within +20± 4dBm (*6) | 5. Set HS to [High Power] moc Confirm TX power level withir dBm (*6) |
| 5 | Antenna Diversity confirmation | 7. Set BU to [Test STANDBY] mode (*5) (Press [Locator key] once]) / 8.Put wire to ANT2 (*2) and GND (*2). / 9.Connect this wire to spectrum analyzer or Marconi. / 10. Press [1] key / 11. Set BU to [High Power] mode (*5) / 12. Confirm TX power level within +20± 4dBm (*6) | |
| 6 | Receiver confirmation | Same as Item 1b. | Same as Item 1b. |

**(*1) BU; Base Unit, HS; Handset.**
**(*2) See Base Unit Reference Drawing.**
**(*3) See Handset Reference Drawing.**
**(*4) See RF Unit Reference Drawing.**
**(*5) See TEST MODE AND ADJUSTMENT.**
**(*6) See TX-Power Specification Table Table to get correlated value of TX-Power limit.**

## 7.7.5. TX-Power Specification Table

**TX-Power (Low) Limit (without 20dB Attenuator)**

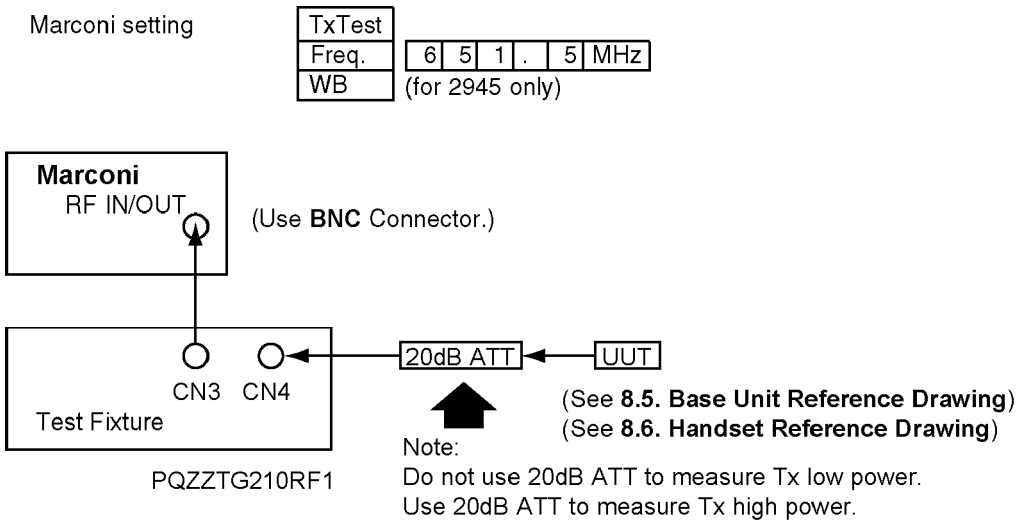
| Loss (CN4-CN3) | | 15.5dB | 15.6dB | 15.7dB | 15.8dB | 15.9dB |
|---|---|---|---|---|---|---|
| Test Equipment | Unit | Low ~ High | Low ~ High | Low ~ High | Low ~ High | Low ~ High |
| Spectrum Analyzer | dBm | -5 ~ 10 | -5 ~ 10 | -5 ~ 10 | -5 ~ 10 | -5 ~ 10 |
| Marconi 2945or SP-ANA w/JIG | dBm | -20.5 ~ -5.5 | -20.6 ~ -5.6 | -20.7 ~ -5.7 | -20.8 ~ -5.8 | -20.9 ~ -5.9 |
| | μW | 8.9 ~ 281.8 | 8.7 ~ 275.4 | 8.5 ~ 269.2 | 8.3 ~ 263.0 | 8.1 ~ 257.0 |
| Marconi 2955B | dBm | -21.7 ~ -6.7 | -21.8 ~ -6.8 | -21.9 ~ -6.9 | -22.0 ~ -7.0 | -22.1 ~ -7.1 |
| | μW | 6.8 ~ 213.8 | 6.6 ~ 208.9 | 6.5 ~ 204.2 | 6.3 ~ 199.5 | 6.2 ~ 195.0 |

| Loss (CN4-CN3) | | 16.0dB | 16.1dB | 16.2dB | 16.3dB | 16.4dB |
|---|---|---|---|---|---|---|
| Test Equipment | Unit | Low ~ High | Low ~ High | Low ~ High | Low ~ High | Low ~ High |
| Spectrum Analyzer | dBm | -5 ~ 10 | -5 ~ 10 | -5 ~ 10 | -5 ~ 10 | -5 ~ 10 |
| Marconi 2945or SP-ANA w/JIG | dBm | -21.0 ~ -6.0 | -21.1 ~ -6.1 | -21.2 ~ -6.2 | -21.3 ~ -6.3 | -21.4 ~ -6.4 |
| | μW | 7.9 ~ 251.2 | 7.8 ~ 245.5 | 7.6 ~ 239.9 | 7.4 ~ 234.4 | 7.2 ~ 229.1 |
| Marconi 2955B | dBm | -22.2 ~ -7.2 | -22.3 ~ -7.3 | -22.4 ~ -7.4 | -22.5 ~ -7.5 | -22.6 ~ -7.6 |
| | μW | 6.0 ~ 190.5 | 5.9 ~ 186.2 | 5.8 ~ 182.0 | 5.6 ~ 177.8 | 5.5 ~ 173.8 |

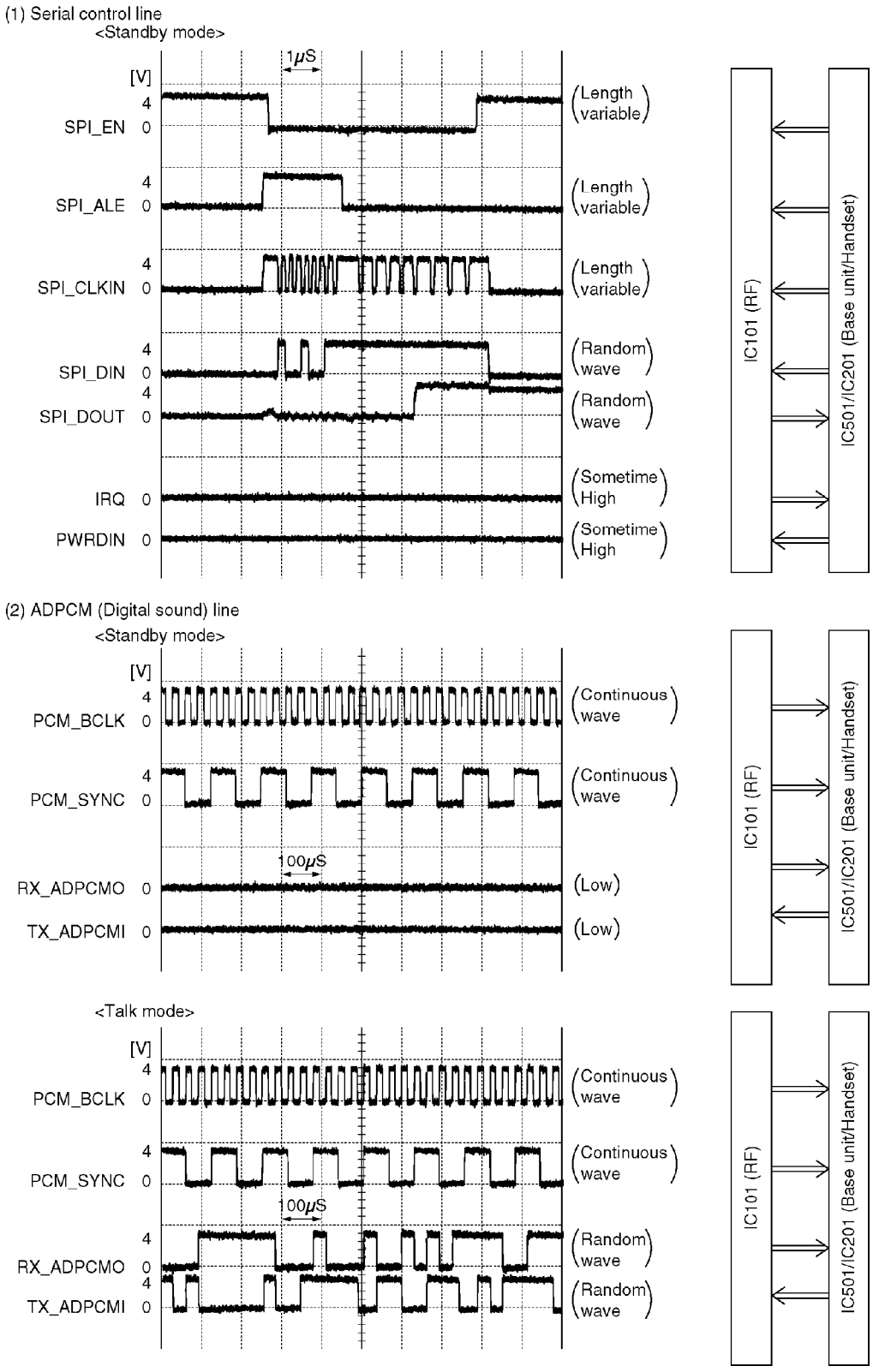
**TX Power (High) Limit (with 20dB Attenuator)**

| Loss (CN4-CN3) | | 15.5dB | 15.6dB | 15.7dB | 15.8dB | 15.9dB |
|---|---|---|---|---|---|---|
| Test Equipment | Unit | Low ~ High | Low ~ High | Low ~ High | Low ~ High | Low ~ High |
| Spectrum Analyzer | dBm | 16 ~ 24 | 16 ~ 24 | 16 ~ 24 | 16 ~ 24 | 16 ~ 24 |
| Marconi 2945or SP-ANA w/JIG | dBm | -19.5 ~ -11.5 | -19.6 ~ -11.6 | -19.7 ~ -11.7 | -19.8 ~ -11.8 | -19.9 ~ -11.9 |
| | μW | 11.2 ~ 70.8 | 11.0 ~ 69.2 | 10.7 ~ 67.6 | 10.5 ~ 66.1 | 10.2 ~ 64.6 |
| Marconi 2955B | dBm | -20.7 ~ -12.7 | -20.8 ~ -12.8 | -20.9 ~ -12.9 | -21.0 ~ -13.0 | -21.1 ~ -13.1 |
| | μW | 8.5 ~ 53.7 | 8.3 ~ 52.5 | 8.1 ~ 51.3 | 7.9 ~ 50.1 | 7.8 ~ 49.0 |

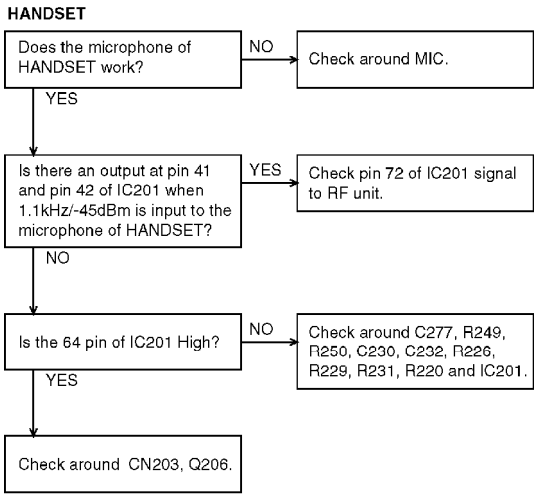
| Loss (CN4-CN3) | | 16.0dB | | | 16.1dB | | | 16.2dB | | | 16.3dB | | | 16.4dB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test Equipment | Unit | Low | ~ | High | Low | ~ | High | Low | ~ | High | Low | ~ | High | Low | ~ | High |
| Spectrum Analyzer | dBm | 16 | ~ | 24 | 16 | ~ | 24 | 16 | ~ | 24 | 16 | ~ | 24 | 16 | ~ | 24 |
| Marconi 2945or SP-ANA w/JIG | dBm | -21.2 | ~ | -13.2 | -21.3 | ~ | -13.3 | -21.4 | ~ | -13.4 | -21.5 | ~ | -13.5 | -21.6 | ~ | -13.6 |
| | μW | 7.6 | ~ | 47.9 | 7.4 | ~ | 46.8 | 7.2 | ~ | 45.7 | 7.1 | ~ | 44.7 | 6.9 | ~ | 43.7 |
| Marconi 2955B | dBm | -21.2 | ~ | -13.2 | -21.3 | ~ | -13.3 | -21.4 | ~ | -13.4 | -21.5 | ~ | -13.5 | -21.6 | ~ | -13.6 |
| | μW | 7.6 | ~ | 47.9 | 7.4 | ~ | 46.8 | 7.2 | ~ | 45.7 | 7.1 | ~ | 44.7 | 6.9 | ~ | 43.7 |

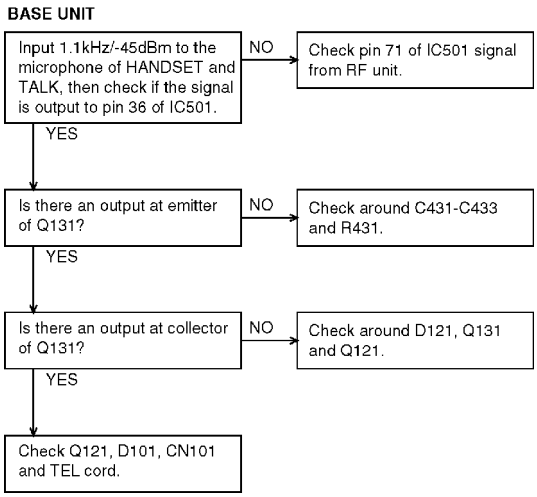



## 7.7.6. RF-DSP Interface Signal Wave Form



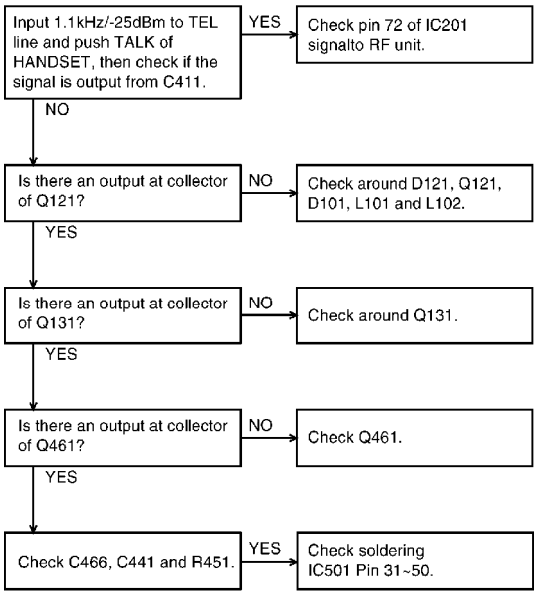

## 7.8. Check Handset Voice Transmission


HANDSET
Does the microphone of HANDSET work?
NO
Check around MIC.
YES
Is there an output at pin 41 and pin 42 of IC201 when 1.1kHz/-45dBm is input to the microphone of HANDSET?
YES
Check pin 72 of IC201 signal to RF unit.
NO
Is the 64 pin of IC201 High?
NO
Check around C277, R249, R250, C230, C232, R226, R229, R231, R220 and IC201.
YES
Check around CN203, Q206.

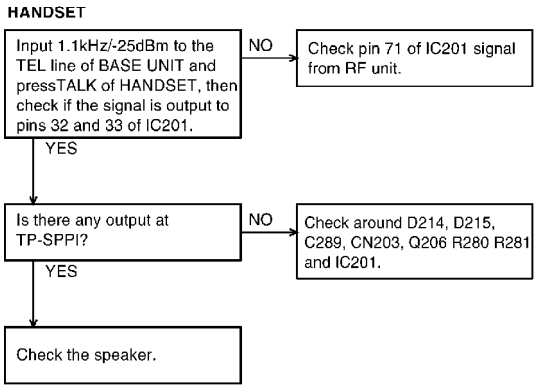

BASE UNIT
Input 1.1kHz/-45dBm to the microphone of HANDSET and TALK, then check if the signal is output to pin 36 of IC501.
NO
Check pin 71 of IC501 signal from RF unit.
YES
Is there an output at emitter of Q131?
NO
Check around C431-C433 and R431.
YES
Is there an output at collector of Q131?
NO
Check around D121, Q131 and Q121.
YES
Check Q121, D101, CN101 and TEL cord.

## 7.9. Check Handset Voice Reception

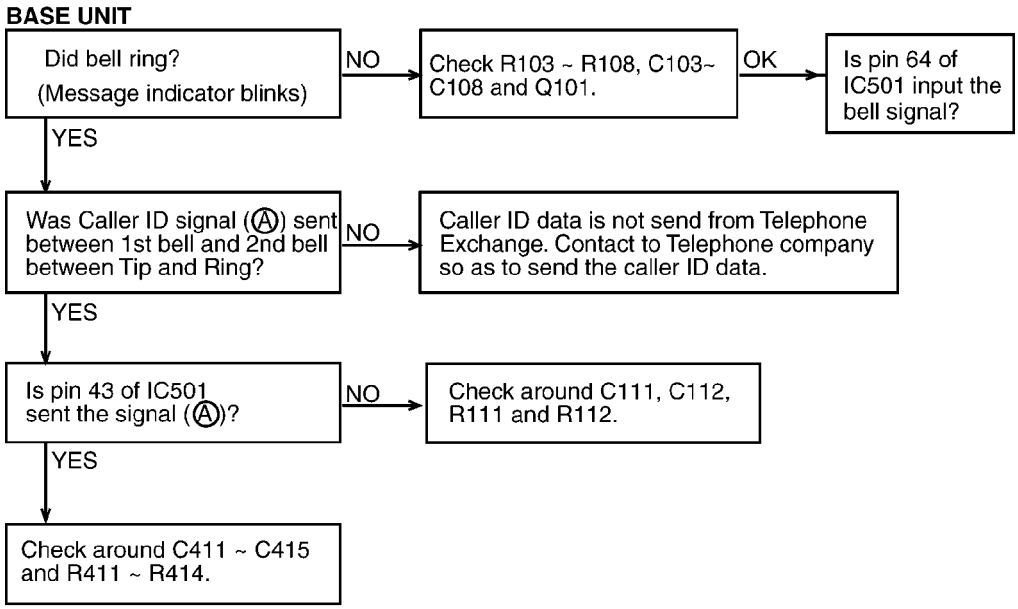
**BASE UNIT**

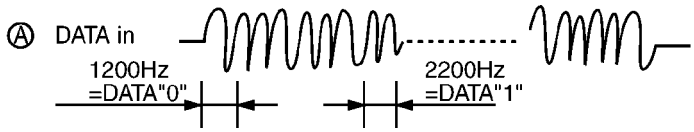

Input 1.1kHz/-25dBm to TEL line and push TALK of HANDSET, then check if the signal is output from C411.
YES
Check pin 72 of IC201 signalto RF unit.
NO
Is there an output at collector of Q121?
NO
Check around D121, Q121, D101, L101 and L102.
YES
Is there an output at collector of Q131?
NO
Check around Q131.
YES
Is there an output at collector of Q461?
NO
Check Q461.
YES
Check C466, C441 and R451.
YES
Check soldering IC501 Pin 31~50.

**HANDSET**


Input 1.1kHz/-25dBm to the TEL line of BASE UNIT and pressTALK of HANDSET, then check if the signal is output to pins 32 and 33 of IC201.
NO
Check pin 71 of IC201 signal from RF unit.
YES
Is there any output at TP-SPPI?
NO
Check around D214, D215, C289, CN203, Q206 R280 R281 and IC201.
YES
Check the speaker.

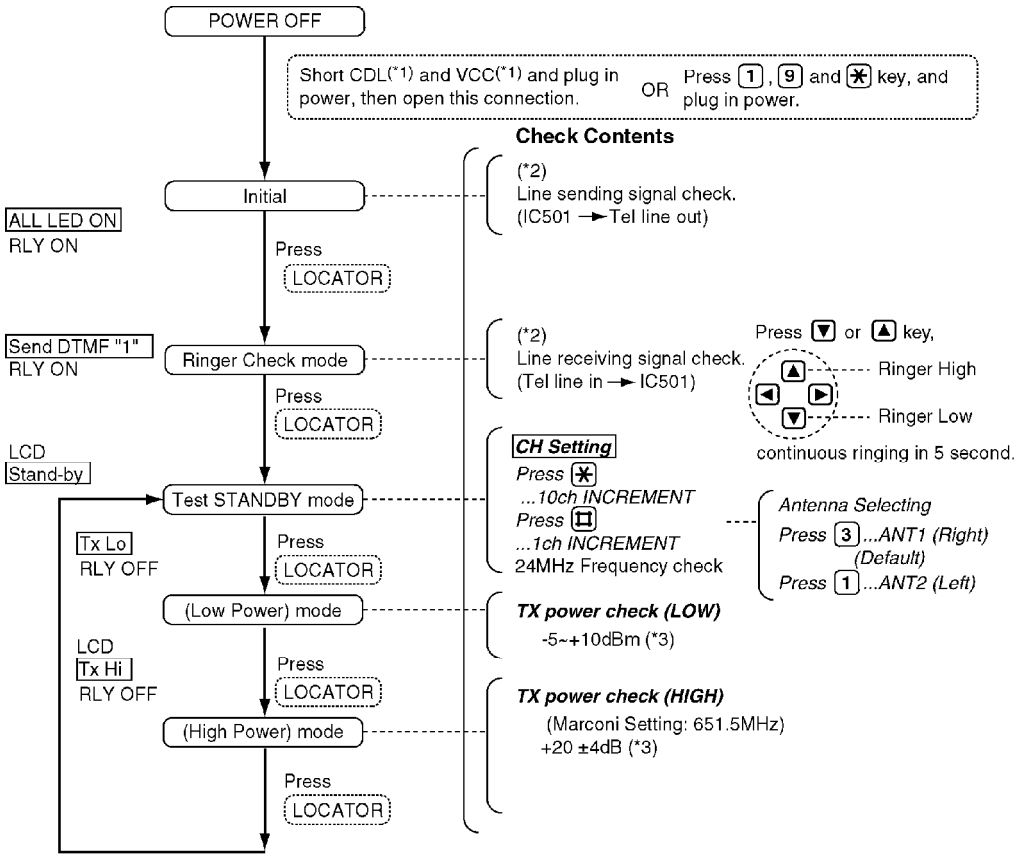
## 7.10. Check Call ID


BASE UNIT
Did bell ring?
(Message indicator blinks)
NO
Check R103 ~ R108, C103~ C108 and Q101.
OK
Is pin 64 of IC501 input the bell signal?
YES
Was Caller ID signal (Ⓐ) sent between 1st bell and 2nd bell between Tip and Ring?
NO
Caller ID data is not send from Telephone Exchange. Contact to Telephone company so as to send the caller ID data.
YES
Is pin 43 of IC501 sent the signal (Ⓐ)?
NO
Check around C111, C112, R111 and R112.
YES
Check around C411 ~ C415 and R411 ~ R414.




# 8. TEST MODE AND ADJUSTMENT

## 8.1. Test Mode Flow Chart for Base Unit

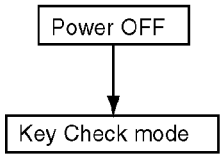



**(*1) See Base Unit Reference Drawing.**

**(*2) Special check method for Base Unit individually.**

**(*3) See TX-Power Specification Table.**

## 8.2. Key Check Mode

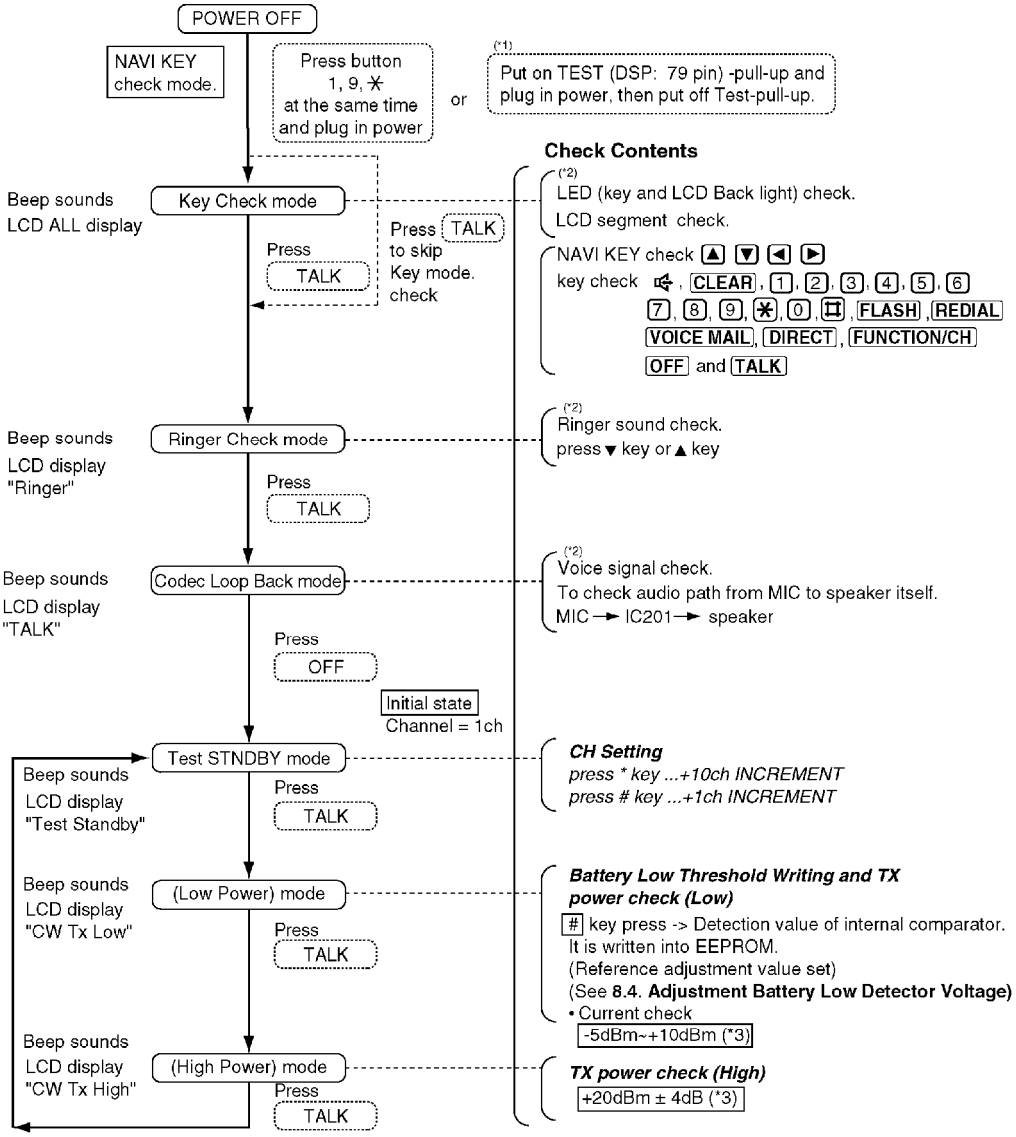



Pull up a TAM(*1) pin and Plug in power
or
Press 3,7 and # key ,simultaneously and plug in power

Press all key without "LOCATOR" and press "LOCATOR" at the end.
Then, long beep is rung. This means all keys are OK.
If not, three beep (pi pi pi) is rung. This means to mistake to press keys or some key is wrong.

**(*1) See Base Unit Reference Drawing.**

## 8.3. Test Mode Flow Chart for Handset


POWER OFF
NAVI KEY check mode.
Press button 1, 9, ✳ at the same time and plug in power
or
(*1)
Put on TEST (DSP: 79 pin) -pull-up and plug in power, then put off Test-pull-up.
Check Contents
Beep sounds
LCD ALL display
Key Check mode
Press TALK to skip Key mode. check
Press TALK
(*2)
LED (key and LCD Back light) check.
LCD segment check.
NAVI KEY check ▲ ▼ ◀ ▶
key check , CLEAR, 1, 2, 3, 4, 5, 6, 7, 8, 9, ✳, 0, #, FLASH, REDIAL, VOICE MAIL, DIRECT, FUNCTION/CH, OFF and TALK
Beep sounds
LCD display "Ringer"
Ringer Check mode
(*2)
Ringer sound check.
press ▼ key or ▲ key
Press TALK
Beep sounds
LCD display "TALK"
Codec Loop Back mode
(*2)
Voice signal check.
To check audio path from MIC to speaker itself.
MIC → IC201 → speaker
Press OFF
Initial state
Channel = 1ch
Beep sounds
LCD display "Test Standby"
Test STNDBY mode
CH Setting
press * key ...+10ch INCREMENT
press # key ...+1ch INCREMENT
Press TALK
Beep sounds
LCD display "CW Tx Low"
(Low Power) mode
Battery Low Threshold Writing and TX power check (Low)
# key press -> Detection value of internal comparator.
It is written into EEPROM.
(Reference adjustment value set)
(See 8.4. Adjustment Battery Low Detector Voltage)
• Current check
-5dBm~+10dBm (*3)
Press TALK
Beep sounds
LCD display "CW Tx High"
(High Power) mode
TX power check (High)
+20dBm ± 4dB (*3)
Press TALK

(*1) See **8.6. Handset Reference Drawing**
(*2) Special check method for Handset individually.
(*3) See **7.7.5. TX Power specification Table.**

## 8.4. Adjustment Battery Low Detector Voltage

**After replacing handset's DSP (IC201), Re-writing Battery Low voltage to EEPROM is required.**
**Following Test mode flow chart (Refer to Test Mode Flow Chart for Handset),**
**DC power supply and Battery connector are required in this adjustment.**

**1. Set 2.6V for DC power supply.**
**2. Place handset in test mode.**
**3. Press "TALK" key twice, "OFF" key once and "TALK" key again to TX-Low mode. (CW Tx Low is displayed on LCD)**
**4. Set 2.37V for DC power supply.**
**Note: Check voltage at battery connector, because some voltage drop is happened, using long or thin cable.**
**5. Press "#"key to write voltage value in EEPROM.**
**6. Turn power off. Then this value is available.**

## 8.5. Base Unit Reference Drawing

## 8.6. Handset Reference Drawing

## 8.7. Frequency Table

**(TDD: time division duplex)**

| Channel | TX/RX Frequency (GHz) | Channel | TX/RX Frequency (GHz) |
|---|---|---|---|
| 1 | 2.4015 | 13 | 2.4375 |
| 2 | 2.4045 | 14 | 2.4405 |
| 3 | 2.4075 | 15 | 2.4435 |
| 4 | 2.4105 | 16 | 2.4465 |
| 5 | 2.4135 | 17 | 2.4495 |
| 6 | 2.4165 | 18 | 2.4525 |
| 7 | 2.4195 | 19 | 2.4555 |
| 8 | 2.4225 | 20 | 2.4585 |
| 9 | 2.4255 | 21 | 2.4615 |
| 10 | 2.4285 | 22 | 2.4645 |
| 11 | 2.4315 | 23 | 2.4675 |
| 12 | 2.4345 | 24 | 2.4705 |

# 9. DESCRIPTION

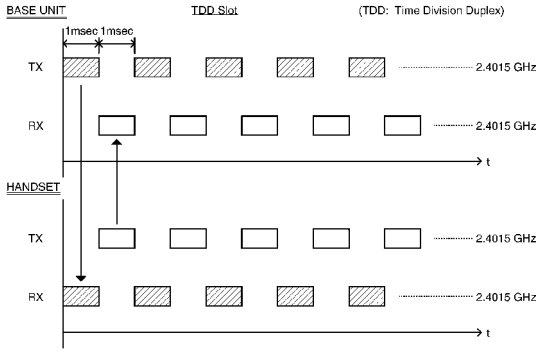
## 9.1. Frequency

**The frequency range of 2.4015 GHz ~ 2.4705 GHz is used. Transmitting and receiving channel between base unit and handset is same frequency. Refer to the Frequency Table.**

## 9.2. Time Division Duplex (TDD) operation

**Transmission/reception between the base unit and handset is performed by time-sharing as shown in Fig. 7. 1 slot time of transmission and reception is 1mS.Same frequency is used in transmitting and receiving. The figure shows an example; the frequency of 1ch is used in transmitting between the base unit and handset.**

**Fig. 7**

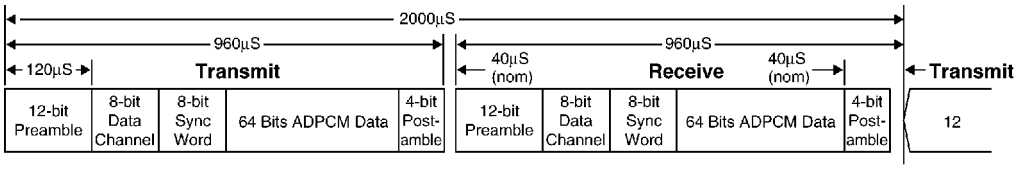



### 9.2.1. TDD Frame Format

**The TDD frame is 2mS in length, and is composed of two symmetrical 960 μS TX and RX subframes. Each subframe contains 96 bits of 10 μS duration, with 40 μS guard times between both TX and RX subframes.**
**Each subframe consists of the following five fields:**

- **A 12-bit Preamble field**
- **An 8-bit Data Channel field**
- **An 8-bit Sync Word**
- **A 64-bit ADPCM Payload**
- **A 4-bit Post-amble**

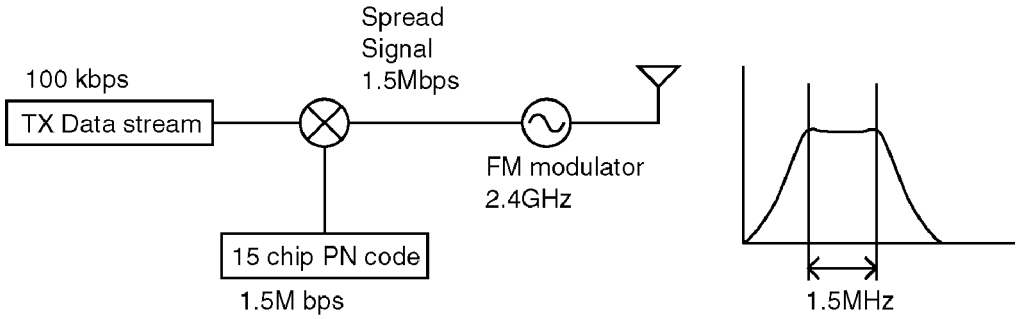
**Both the 8-bit sync word and 8-bit data channel are programmable via the DSP interface. In addition, the 64-bit payload can be filled either with ADPCM voice data, or can be used by the host DSP as a fast data channel between base and handset.**




## 9.3. Spread Spectrum

**Transmission and reception are operated using the spread spectrum method.**
**DSS (Digital Spread Spectrum)**
**Mixing the original signal with the pseudo random noise code (PN code) works the spread spectrum. In this system PN code is 15 chip. Although the band width is spread fifteen times, the power level per channel becomes lower.**

**Fig. 8**




## 9.4. Signal Flowchart in the Whole System

### Reception

**CN101 of the base unit is connected to the TEL line, and the signal is input through the bridge diode D101. While talking the relay (Q121) is turned ON and amplified at the amplifiers Q461, then led to DSP (IC501). DSP generates ADPCM signal. The ADPCM signal is input to RFIC (IC101) of RF UNIT, and is mixed with pseudo random noise code (PN code) to spread the spectrum. RFIC outputs FSK modulated RF signal. The RF signal is passed through the balun (T101) and filter (L107) to the T/R switch (IC109). And the RF signal amplifies by the power amplifier (IC105) and fed into T/R switch (IC110) and passes through filter (L106) to Diversity ANTENNA. As for the handset, RF signal from the antenna passes through filter (L106) and switch by T/R switch (IC110) to LNA (IC106). The RF signal is amplified by LNA (IC106) and switched by T/R switch (IC109) and input to RFIC passing through filter (L107) and the balun (T101) to perform the de-spread, then input to DSP (IC201). DSP performs ADPCM decoding to convert the signal into the voice signal, then it is output to the speaker.**

### Transmission

**The voice signal input from the microphone is led to DSP (IC201). The DSP generates ADPCM signal. As well as the reception, it is converted into the RF signal by RFIC (IC101). Passing through the balun (T101) and filter (L107), to the T/R switch (IC109). And the RF signal amplifies by the power amprifier (IC105) and fed into T/R switch (IC110) and passes through filter (L106) to ANTENNA. As for the base unit, RF signal from the Diversity antenna passes through filter (L106) and switch by T/R switch (IC110) to LNA (IC106). The RF signal is amplified by LNA (IC106) and switched by T/R switch (IC109) and is input to RFIC (IC101) passing through filter (L107) and the balum (T101) to perform the de-spread, then input to DSP (IC201). DSP performs ADPCM decoding to convert the signal into the voice signal. The voice signal is amplified at the TX amplifier (Q131), then output to the TEL line (CN101) through the relay (Q121) and bridge (D101).**

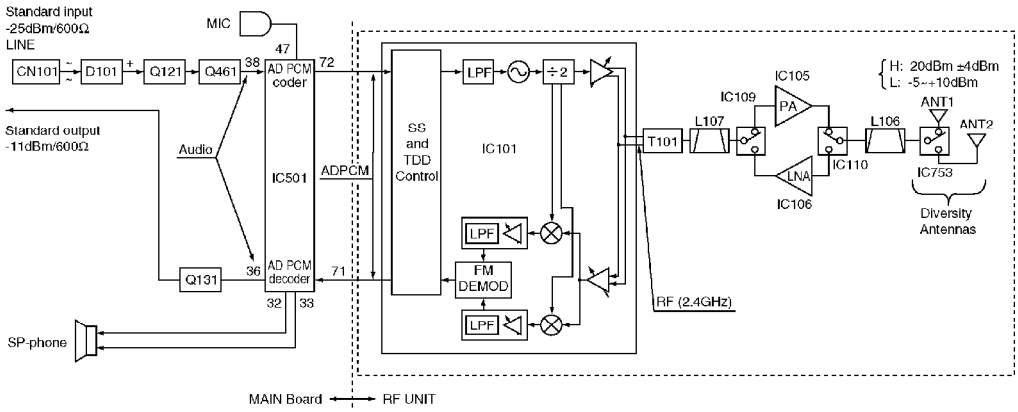



Fig. 9-1 BASE UNIT

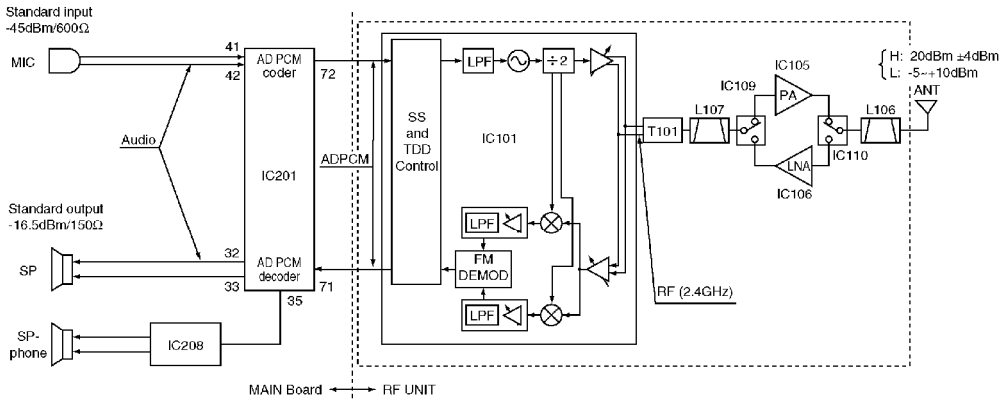
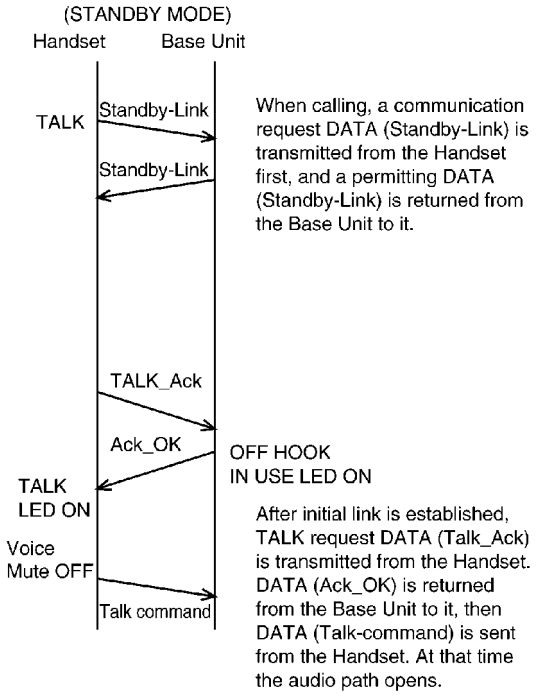


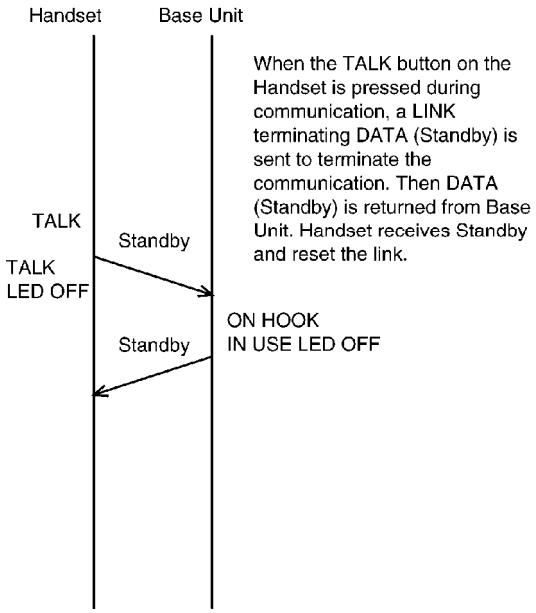

Fig. 9-2 HANDSET

# 9.5. Explanation of DSP Data Communication

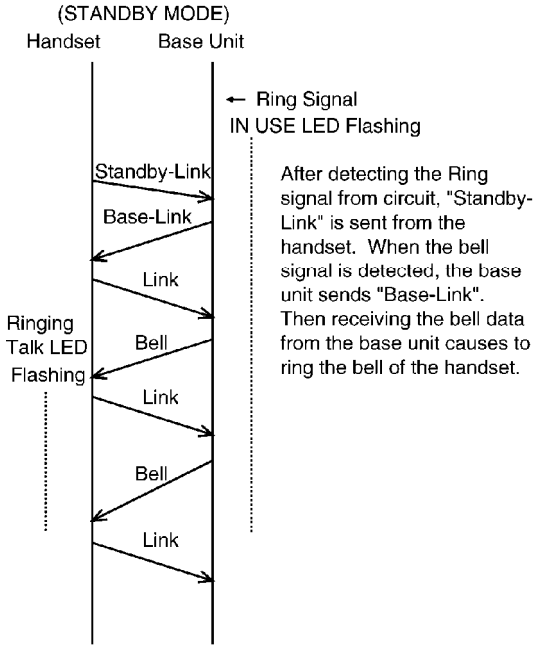
## 9.5.1. Calling


(STANDBY MODE)
Handset
Base Unit
TALK
Standby-Link
Standby-Link
When calling, a communication request DATA (Standby-Link) is transmitted from the Handset first, and a permitting DATA (Standby-Link) is returned from the Base Unit to it.
TALK_Ack
Ack_OK
OFF HOOK
IN USE LED ON
TALK
LED ON
Voice
Mute OFF
Talk command
After initial link is established, TALK request DATA (Talk_Ack) is transmitted from the Handset. DATA (Ack_OK) is returned from the Base Unit to it, then DATA (Talk-command) is sent from the Handset. At that time the audio path opens.

### 9.5.2. To Terminate Communication

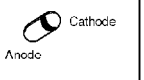
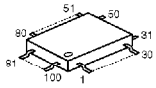
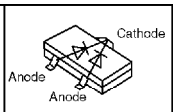
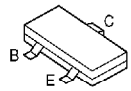
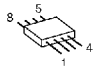
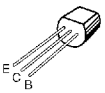
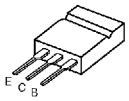
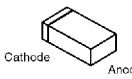
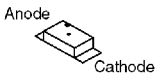
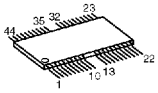
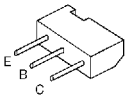
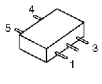
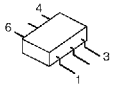

Handset
Base Unit
When the TALK button on the Handset is pressed during communication, a LINK terminating DATA (Standby) is sent to terminate the communication. Then DATA (Standby) is returned from Base Unit. Handset receives Standby and reset the link.
TALK
Standby
TALK
LED OFF
ON HOOK
IN USE LED OFF
Standby

### 9.5.3. Ringing

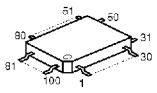
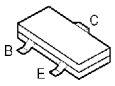
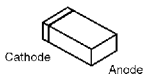
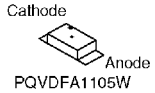
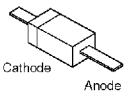

(STANDBY MODE)
Handset
Base Unit
← Ring Signal
IN USE LED Flashing
Standby-Link
After detecting the Ring signal from circuit, "Standby-Link" is sent from the handset. When the bell signal is detected, the base unit sends "Base-Link". Then receiving the bell data from the base unit causes to ring the bell of the handset.
Base-Link
Link
Ringing
Talk LED
Flashing
Bell
Link
Bell
Link

# 10. TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

## 10.1. Base Unit

| | | | | | |
|---|---|---|---|---|---|
|  PQVDRLZ2R0 PQVDRLZ20A |  PQVI16569ADA |  MA153 | 2SD1758Q |  PQVTDTA143EU PQVTDTC143E PQVTDTC114EU, UN5213 2SD1819A, 2SD601A |  PQVIXCF4502P PQVITC7W74U |
|  2SC2120, PQVT2N6517CA, 2SA1625 |  2SD2136 | PQVDS1ZB60F1 |  PQVDHRU0302A MA8047, MA8043, MA8033, MA111, MA8051, MA8036H, MA8220 | | PQVTXP132A11 |
|  PQVDSS24 |  PQWITG2650NH |  2SD1994A | PQVIPS3432UT | 2SD1664Q | PQVINJM2360M |
|  PQVITC7S08FU |  PQVISPM3204T | | | | |

## 10.2. Handset

| | | | | | |
|---|---|---|---|---|---|
|  PQVI16107AFA |  PQVTXP151AB, PQVTDTC143E, PQVDTA143TU, 2SD1819A, |  LNJ211R8ARU MA2ZD1400 MA8150, MA111 |  PQVDFA1105W PQVDHPY1105W PQVDSML310MT PQVDBR1111C | PQWITG2650NR PQVINJM2135R |
| PQVIC61CC22N PQVIC61CC20N | 2SA1797Q | LNJ115W89RA | PQVIC68B102M PQVDEP10LA03 PQVIXCR3302M PQVIMM1385EN |  PQVDEC10 PQVDPTZTE25 | |

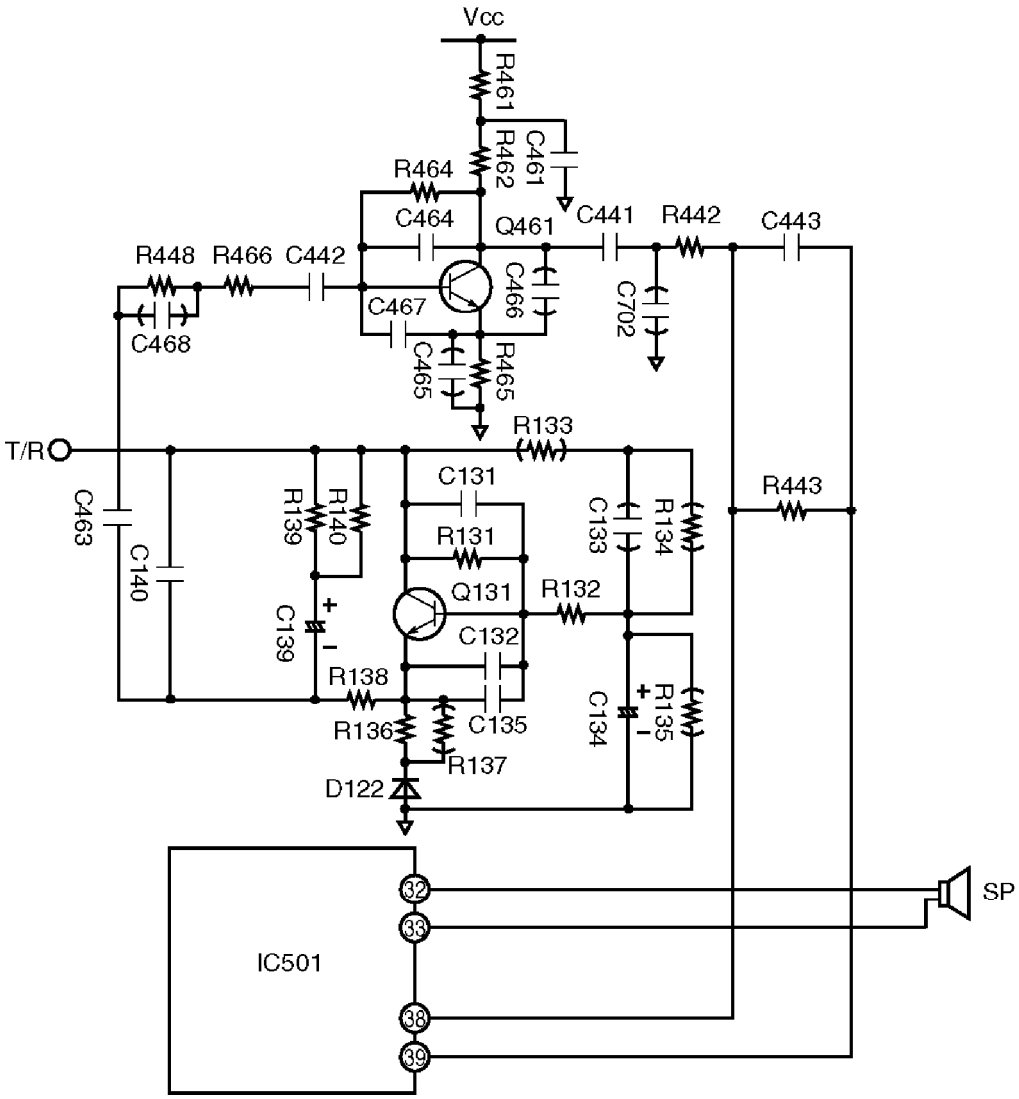
# 11. BLOCK DIAGRAM (Base Unit)

# 12. CIRCUIT OPERATION (Base Unit)

## 12.1. SP-PHONE RX Circuit

**Circuit Operation: / Telephone Line (T/R) → Q131 → C463 → R448 → C442 → R464 → C441 → pin 38 of IC501 → pins 32 and 33 of IC501 → Speaker**

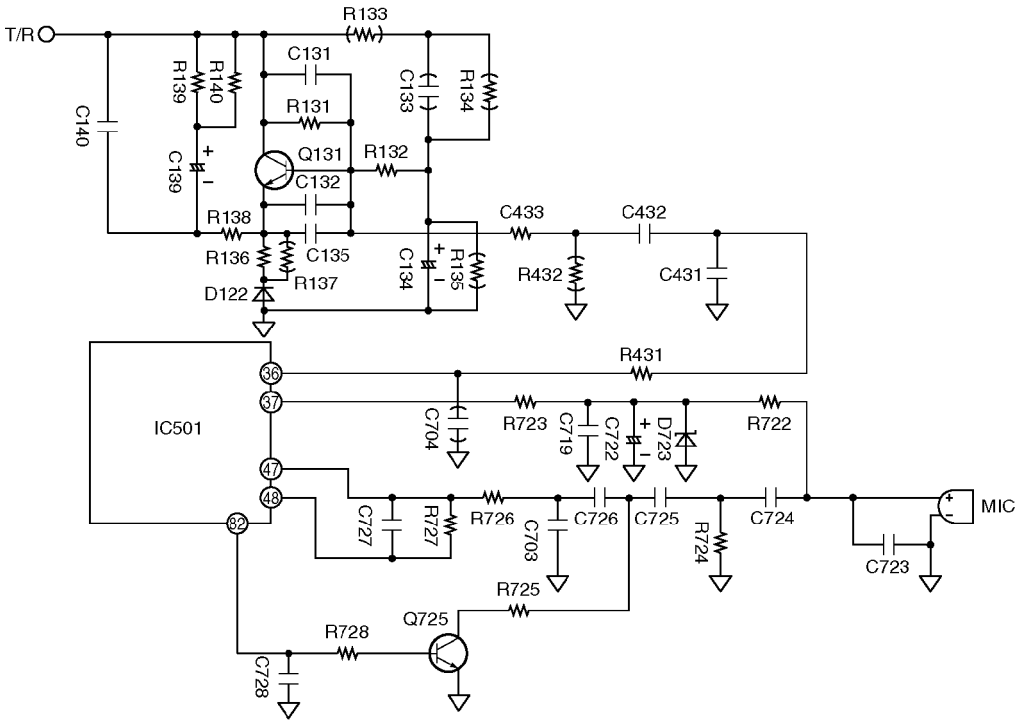
**Circuit Diagram**




## 12.2. SP-PHONE TX Circuit

**Circuit Operation: / MIC → C724 → C725 → C726 → R726 → pin 47 of IC501 → pin 36 of IC501 → R431 → C432 → C433 → Telephone Line**

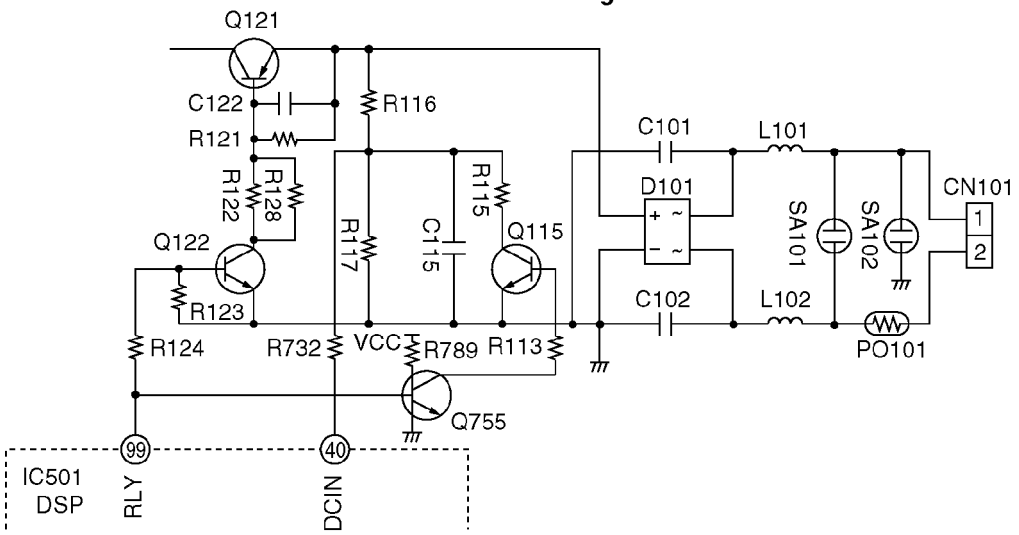
**Circuit Diagram**




## 12.3. Auto Disconnect Circuit

**Function: / This circuit is used to detect the fact that another telephone connected to the same line is OFF-HOOK while the unit is in a receiving status or OGM transmitting status.**
**Circuit Operation: / The voltage pin 40 of IC501 is monitored. If a parallel-connected telephone is put into an OFF HOOK status, the presence/absence of a parallel connection is determined when the voltage changes by 0.2V or more. / When the set detects the parallel-connected telephone is OFF HOOK status, the line is disconnected.**

**Circuit Diagram**

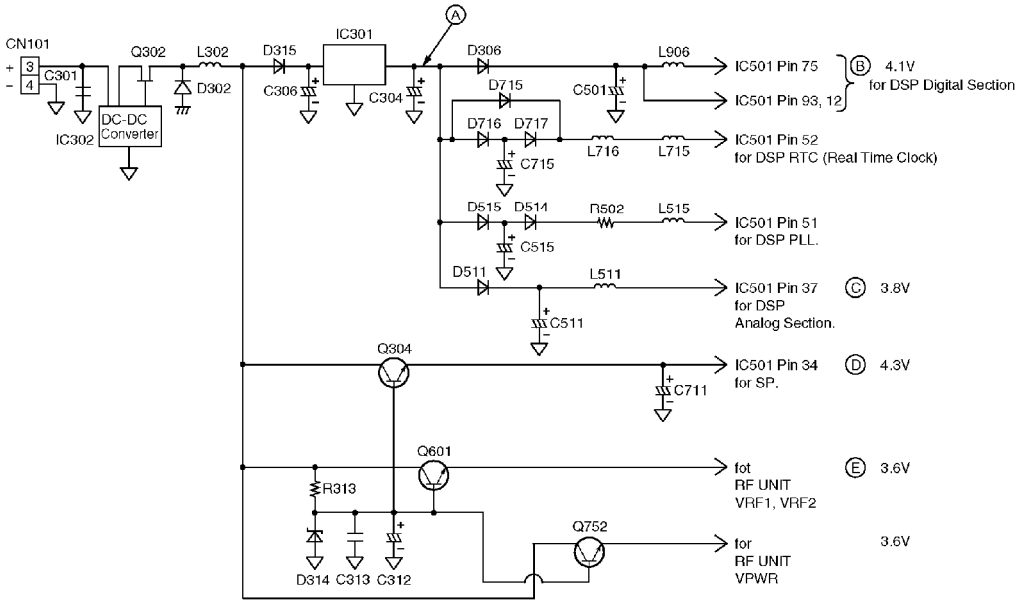



## 12.4. Power Supply Circuit with DC-DC Converter

**Function: / Power from the AC adaptor passes through a DC-DC converter consisting of Q302, L302, D302 and IC302. / DC-DC Converter down converts from 9 V to 6.1 V to get more current**

**with low power loss and low heat radiation.**
**Circuit Operation: / IC301 is a regulated power supply. The voltage at point A is regulated to 4.5 V by IC301. / The voltage at point B is dropped by D306 to 4.1 V. / The voltage at point C is dropped by D511 to 3.8 V.**
**The voltage at point D is dropped by Q304 to 4.3V**
**The voltage at point E is dropped by Q601 to 3.6V**

**Circuit Diagram**



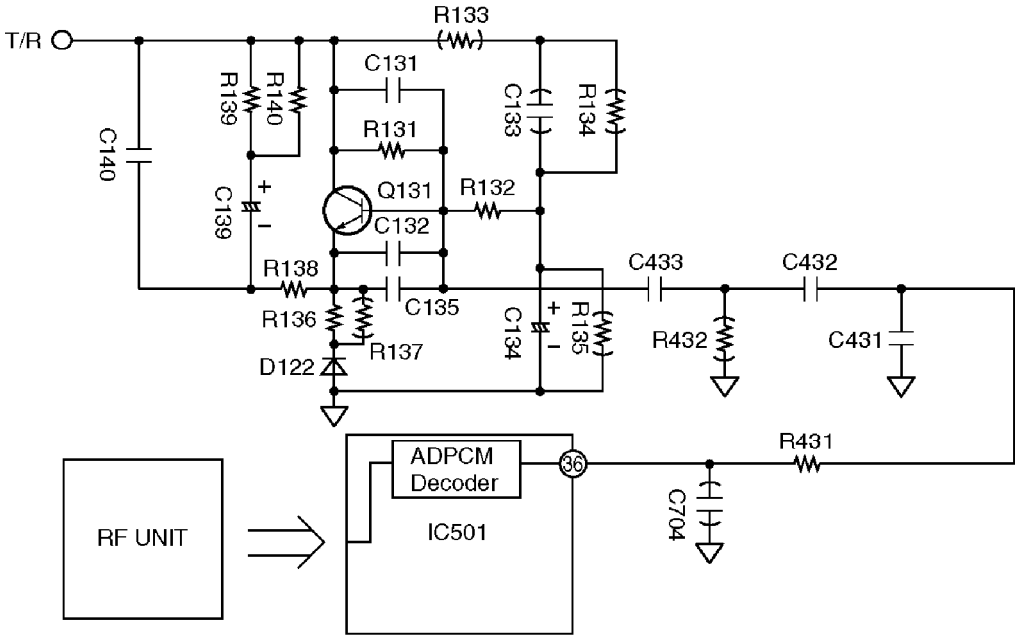

## 12.5. DTMF Signal

**When the DTMF data from the Handset is received, the DTMF signal is output from pin 36 of IC501 and sent to the line through Q131.**

## 12.6. Line Sending Signal

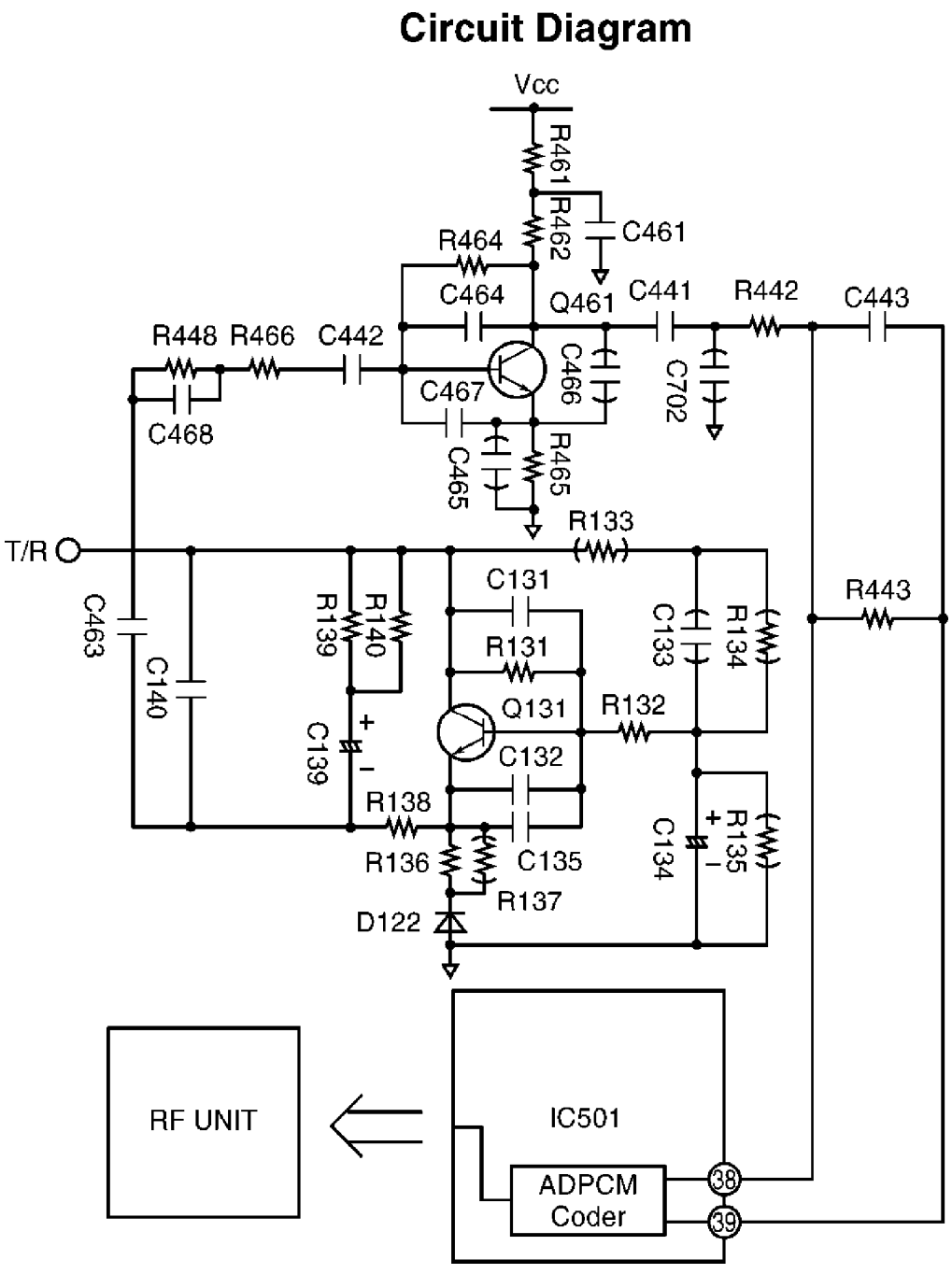
**The coded signal input from the RF unit is decoded by IC501. / The audio signal output from IC501 -36 and is input to telephone line.**

**Circuit Diagram**




## 12.7. Line Receiving Signal

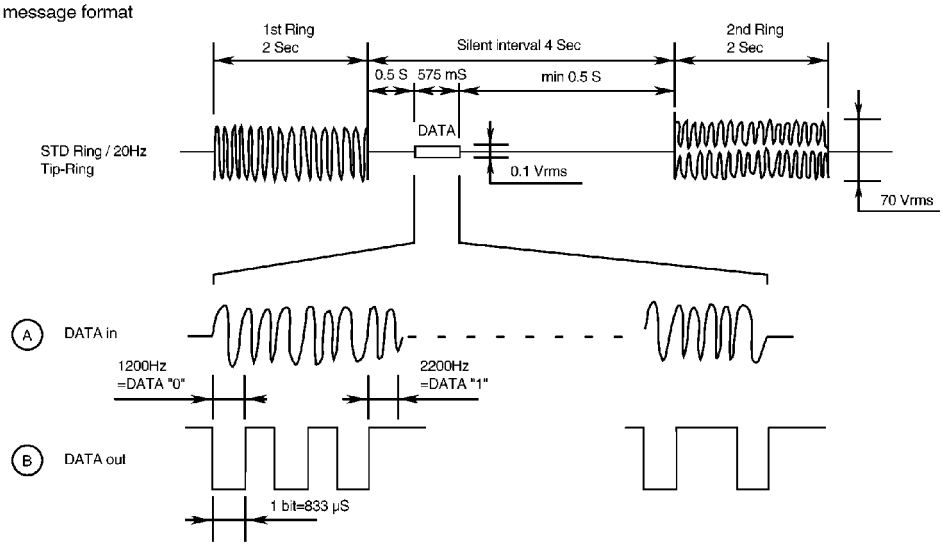
**The audio signal from line passes through Q131 and Q461 to pin38 and 39 of IC501(DSP). IC501 modulates this input audio signal to output to the RF unit.**




## 12.8. Calling Line Identification Circuit (Caller ID)

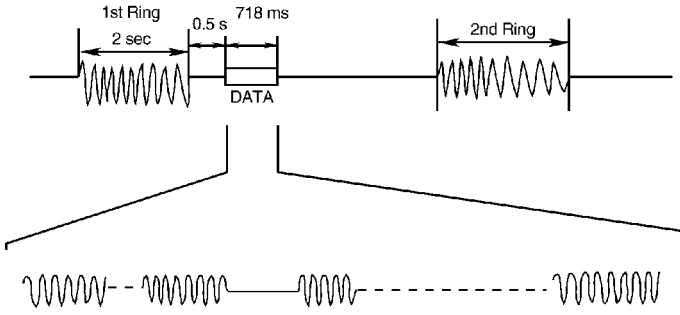
**Function: / The caller ID is a chargeable ID which the user of a telephone circuit obtains by entering a contract with the telephone company to utilize a caller ID service. For this reason, the operation of this circuit assumes that a caller ID service contract has been entered for the circuit being used. / The data for the caller ID from the telephone exchange is sent during the interval between the first and second rings of the bell signal. The data from the telephone exchange is a modem signal which is modulated in an FSK (Frequency Shift Keying) format. Data "0" is a 1200 Hz sine wave, and data 1 a 2200 Hz sine wave. / There are two type of the message format which can be received: i.e. the single message format and plural message format. The plural message format allows to transmit the name and data code information in addition to the time and telephone number data.**

● Single message format




| month | day | hour | minute | number |
|---|---|---|---|---|
| 04 | 15 | 16 | 35 | 2013487000 |

● Plural message format



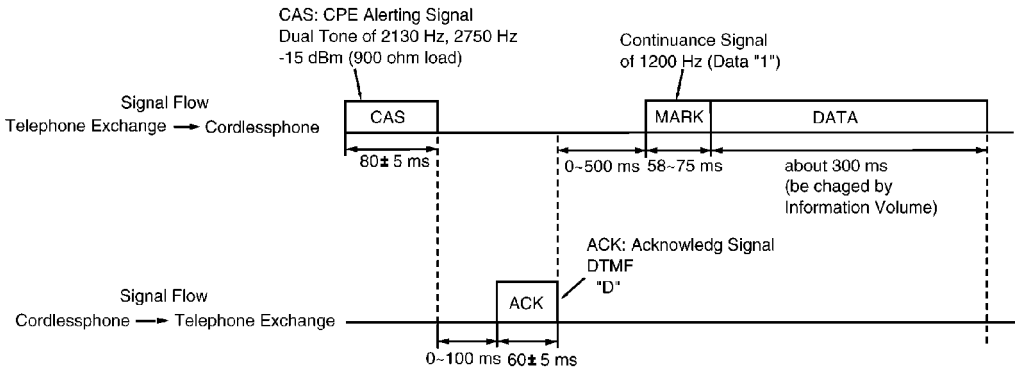

| DATA CODE | NAME |
|---|---|
| 201 | John Smith |

| month | day | hour | minute | number |
|---|---|---|---|---|
| 04 | 16 | 16 | 35 | 2013487000 |

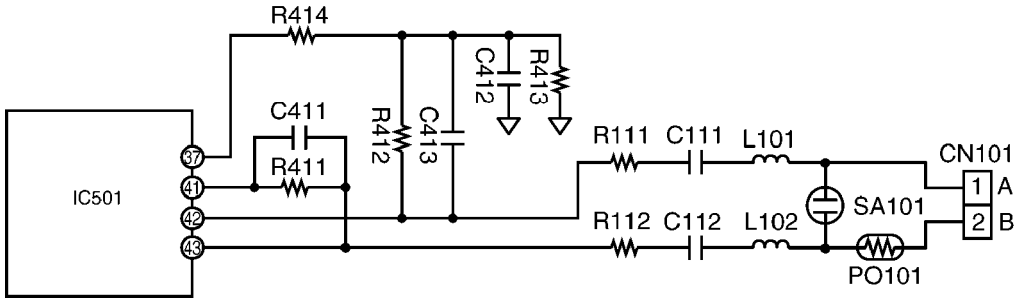
**Call Waiting / Calling Identity Delivery on Call Waiting (CIDCW) is a CLASS service that allows a customer, while off-hook on an existing call, to receive information about a calling party on a waited call. The transmission of the calling information takes place almost immediately after the customer is alerted to the new call so he/she can use this information to decide whether to take the new call.**

**Function: / The CAS signal flows from T/R → R111, R112 collector → C111, C112 → IC501 pins 41~43 and the ACK (DTMF signal) is returned to the telephone exchange. The telephone exchange that received the ACK can send the data in the same manner as the caller ID. If the unit deems that a telephone connected in parallel is in use, ACK is not returned even if CAS is received, and the information for the second and subsequent callers is not displayed on the portable handset display.**

**Call Waiting Format**




**Circuit Diagram**



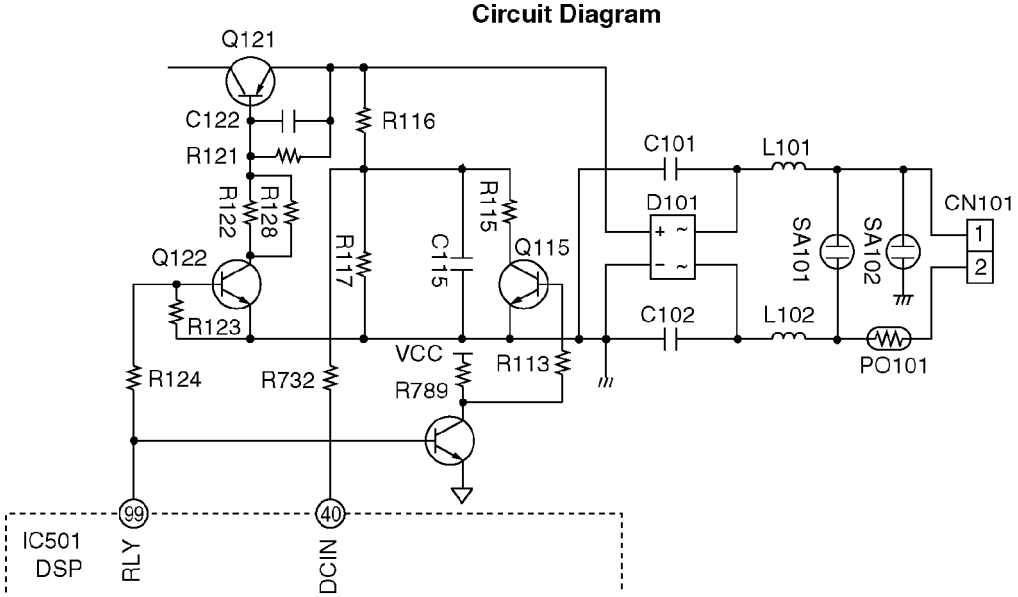

## 12.9. Parallel Connection Detection Circuit

**Function: / In order to disable call waiting and stutter tone functions when using telephones connected in parallel, it is necessary to have a circuit that judges whether a telephone connected in parallel is in use or not. This circuit determines whether the telephone connected in parallel is on hook or off hook by detecting changes in the T/R voltage.**

**Circuit Operation: / Parallel connection detection when on hook: / When on hook Q115 is ON, the voltage is monitored pin 40 of IC501. There is no parallel connection if the voltage is 1.65 V or higher, while a parallel connection is deemed to exist if the voltage is lower.**

**Parallel connection detection when off hook: / When off hook Q115 is OFF, the voltage is monitored pin 40 of IC501; the presence/absence of a parallel connection is determined when the voltage changes by 0.2 V or more.**

Circuit Diagram




## 12.10. Telephone Line Interface

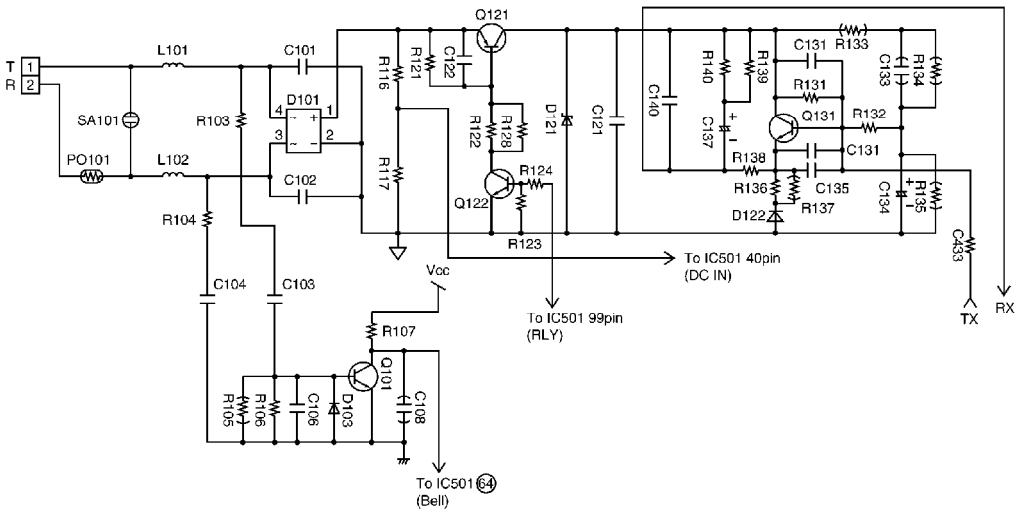
**Circuit Operation:**

**ANSWER / In the idle mode, Q121 is open to cut the DC loop current and decrease the ring load. When ring voltage appears at the Tip (T) and Ring (R) leads (When the telephone rings), the AC ring voltage is transferred as follows: / T → L101 → R103 → C103 → Q101 → IC501 pin 64. / When the CPU (DSP) detects a ring signal, Q121 turns on, thus providing an off-hook condition (active DC current flow through the circuit) and the following signal flow is for the voice signal. / T → D101 → Q121 → Q131 → R138 → C140 → D101 → L102 → PO101 → R**

**ON HOOK / Q121 is open, Q121 is connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an on-hook condition.**

**SPECIFICATIONS / In the on-hook state (idle), the current flows between the telephone line and the unit is as follows: / T → L101 → R103 → C103 → R106 → C104 → R104 → L102 → PO101 → R. / The DC component is blocked by C103, C104: thereby providing an on-hook condition. / The AC interface impedance is over 47 k Ω ; thus, satisfying the telephone company requirements.**

Circuit Diagram



## 12.11. Intercom Mode

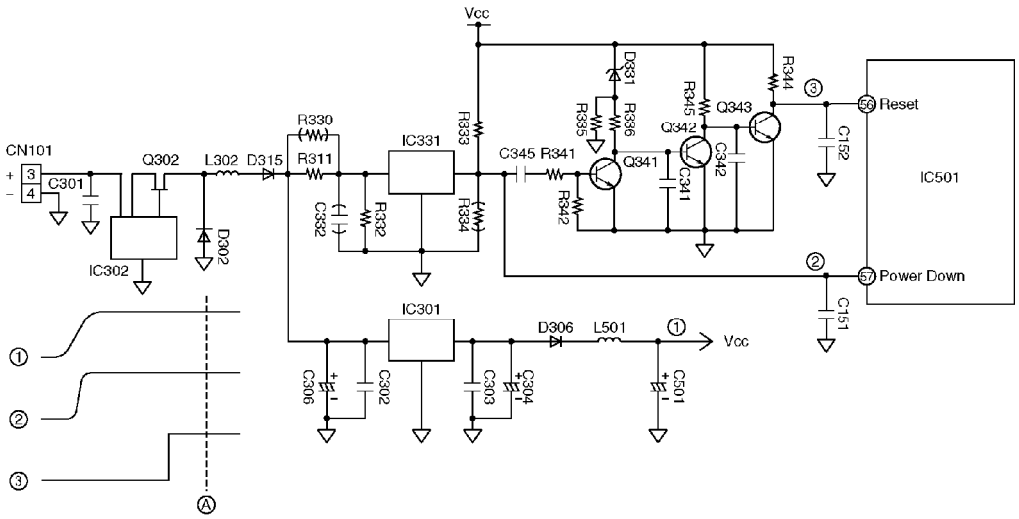
1. When the base unit LOCATOR/INTERCOM button is pressed, a call monitor signal (intercom sound) is output from pins 32 and 33 of IC501. Thus a monitor tone is heard from the speaker.
2. “Paging” is displayed on LCD. This status is called “Intercom stand-by”.
3. The receiving signal flows: / RF → pin 32 and 33 of IC501 → SP
4. The transmission signal flows: / MIC → C724 → C725 → C726 → R726 → pin 47 of IC501 → RF

## 12.12. Initializing Circuit

**Function: / This circuit is used for to initialize the microcomputer when it incorporates an AC adaptor.**

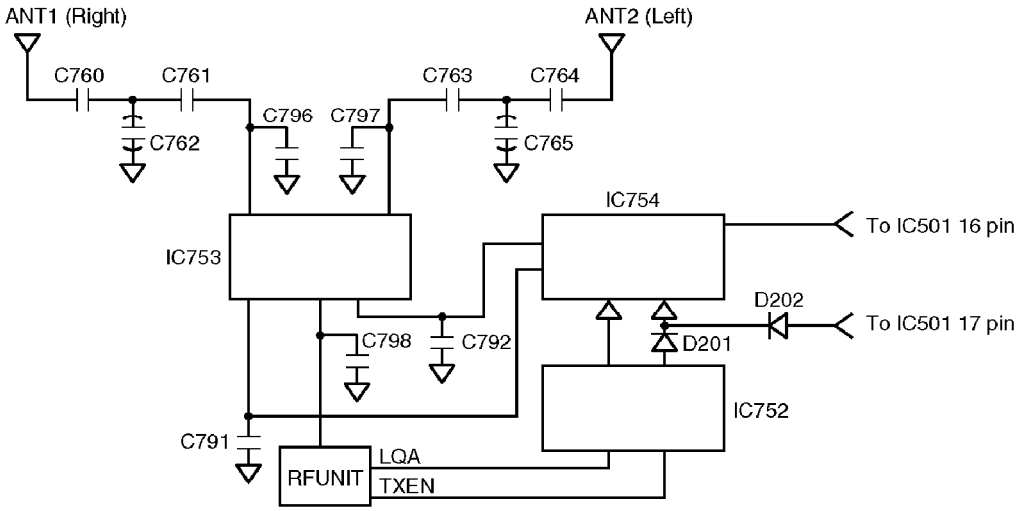
**Circuit Operation: / When the AC Adaptor is inserted into the unit, then the voltage is shifted by IC301, D306 and power is supplied to the DSP. / The set can operate beyond point A in the circuit voltage diagram.**

**Circuit Diagram**




## 12.13. Antenna Diversity

**Antenna Diversity improve conversation quality. This means to reduce some noise during conversation. RF unit send LQA (Link Quality Alarm) signal to IC754 when detecting weak RF signal. Then IC754 control RF switch IC753 to switch another Antenna.**




# 13. BLOCK DIAGRAM (Handset)

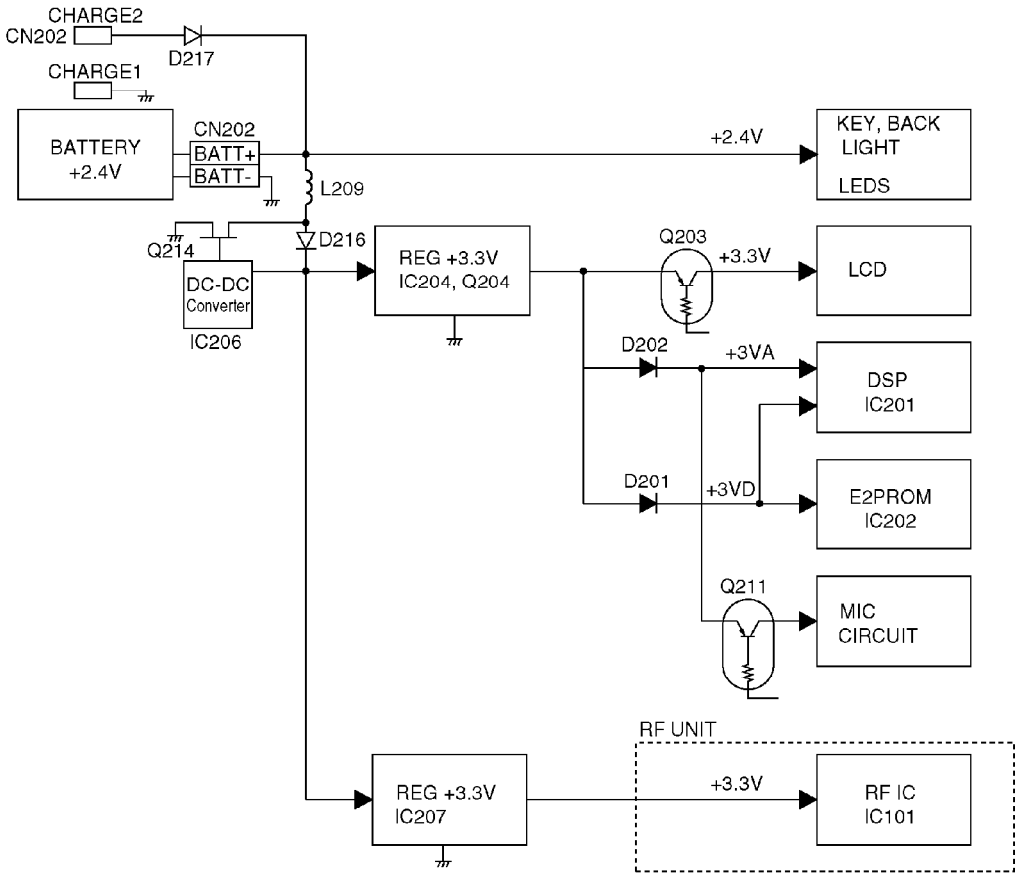
# 14. CIRCUIT OPERATION (Handset)

## 14.1. Power Supply Circuit (DC-DC Converter)

**Voltage is supplied separately to each block.**

**DC-DC converter is consisted in IC206, Q214, D216 and L209. DC-DC converter upconvers from 2.4 V to 3.6 V using two cell Ni-MH Battery.**

**Block Diagram (Handset Power)**

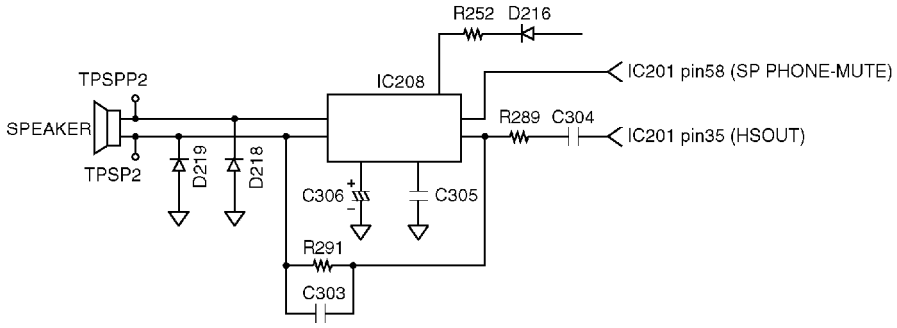



## 14.2. Charge Circuit

**Ni-MH battery is connected to CN202. When the handset is put on the cradle of the base unit, the power is supplied from CHARGE1 and CHARGE2 terminals to charge the battery. Q207 detects the voltage of CHARGE1 and CHARGE2 terminals, then the handset makes ID code setting (*) with the base unit.**

## 14.3. Ringer and SP-Phone Circuit

TG2650N has SP-phone for handsfree operation TG2650N also uses this SP-Phone speaker for Ringer. Press key to use SP-Phone. Then received signal output is switched to pin35 of IC201(DSP). This output signal is amplified by IC208, and fed into speaker. When ringer beeping, ringer signal is also output from pin35 of IC201(DSP). After that, same as above.

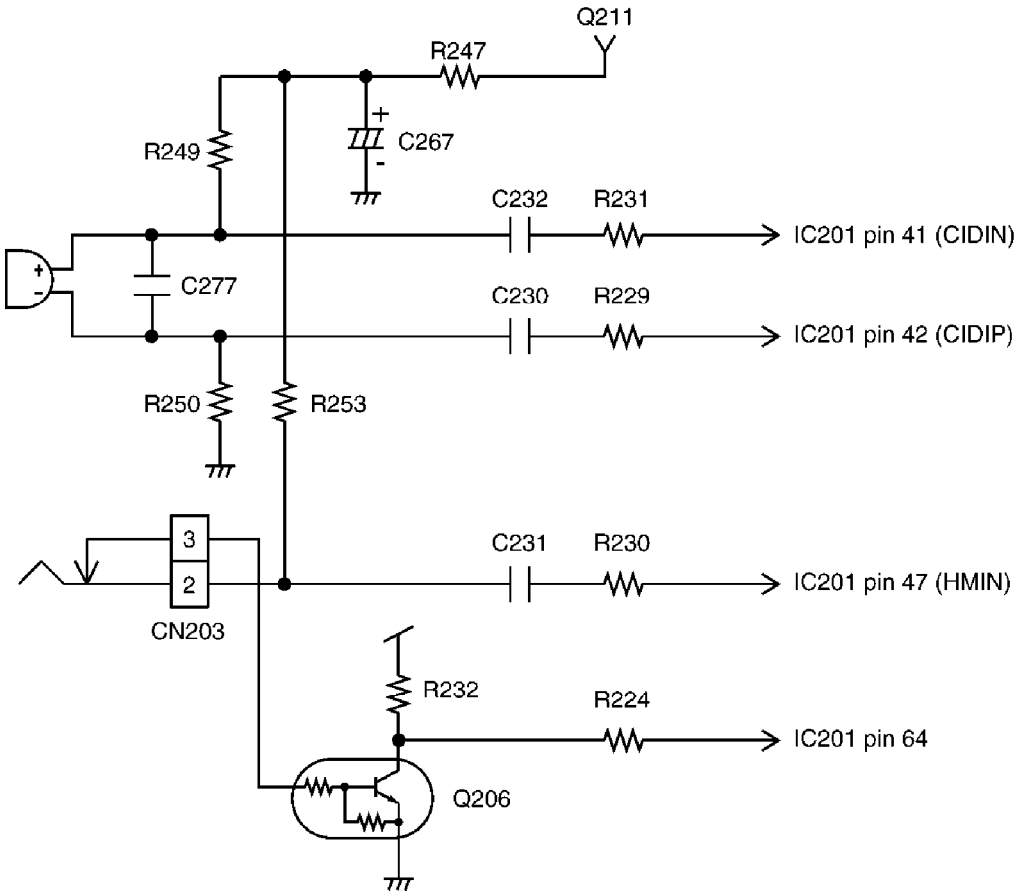



## 14.4. Sending Signal

**The voice signal from the microphone input to pin 42 (CIDIP) and pin 41(CIDIN) of IC201 (DSP). CN203 is the headphone jack. When the headphone is connected, the Q206 detect it. The input**

**from the microphone of the handset (CIDIN, CIDIP) is cut and the microphone signal from the headphone is input to pin 47 of IC201 (HMIN). Also the power for the microphone is supplied from Q211, and the power is turned OFF on standby.**

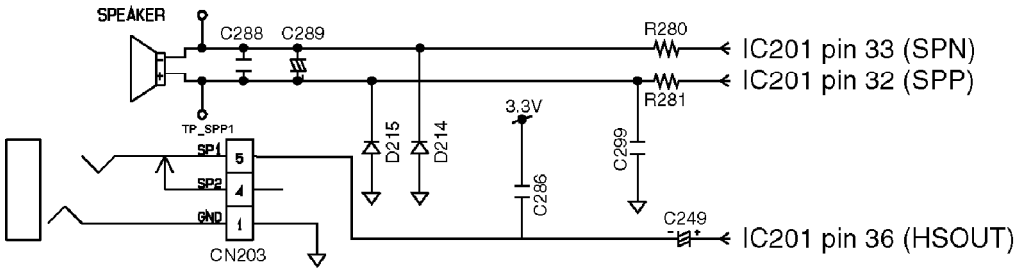
**Circuit Diagram**




## 14.5. Reception Signal Circuit

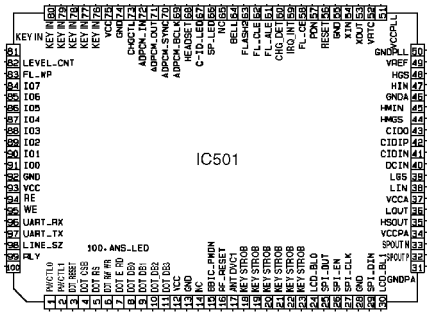
**The received signal from the base unit is output from pins 33 (SPN) and 32 (SPP) of IC201 (DSP) as the voice signal. SPN is the inverse output of SPP, and the speaker is driven by SPN and SPP. CN203 is the headphone jack. When the headphone is connected to this jack, the output to the speaker of the handset (SPN,SPP) is cut and the voice signal is output to the headphone (HSOUT) only.**

**Circuit Diagram**




# 15. CPU DATA (Base Unit)

## 15.1. IC501

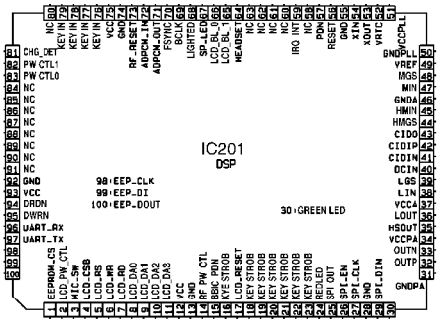



| Pin | Description | I/O | High | High_Z | Low |
|---|---|---|---|---|---|
| 1 | PWCTL0 | D.O | pin2=Hi-Z:HighPower pin2=L:- | - | pin2=Hi-Z:LowPower pin2=L:SuperLowPower |
| 2 | PWCTL1 | D.O | - | pin1=H:HighPower pin1=L:LowPower | pin1=H:- pin1=L:SuperLowPower |
| 3 | DOT_RESET | D.O | Normal | - | Reset |
| 4 | DOT_CSB | D.O | Not | - | Active |
| 5 | DOT_RS | D.O | Data | - | Instruction |
| 6 | DOT_RW_WR | D.O | Read | - | Write |
| 7 | DOT_E_RD | D.O | Active | - | Not |
| 8 | DOT_DB0 | D.O | High | - | Low |
| 9 | DOT_DB1 | D.O | High | - | Low |
| 10 | DOT_DB2 | D.I | High | - | Low |
| 11 | DOT_DB3 | D.O | High | - | Low |
| 12 | VCC | VCC | Vcc | - | - |
| 13 | GND | GND | - | - | GND |
| 14 | NC | D.O | - | - | Normal |
| 15 | BBIC_PWDN | D.O | Not | - | Active |
| 16 | RF_RESET | D.O | Normal | - | Reset |
| 17 | ATN DVC1 | D.O | High | - | Low |
| 18 | KEY STROB | D.O | Active | Not | - |
| 19 | KEY STROB | D.O | Active | Not | - |
| 20 | KEY STROB | D.O | Active | Not | - |
| 21 | KEY STROB | D.O | Active | Not | - |
| 22 | KEY STROB | D.O | Active | Not | - |
| 23 | KEY STROB | D.O | Active | Not | - |
| 24 | LCD BLO | D.O | Off | - | On |
| 25 | SPI_OUT | D.O | High | - | Low |
| 26 | SPI_EN | D.O | Not | - | Active |
| 27 | SPI_CLK | D.O | High | - | Low |
| 28 | GND | GND | - | - | GND |
| 29 | SPI_DIN | D.I | High | - | Low |
| 30 | LCD_BL1 | D.O | Off | - | On |
| 31 | GNDPA | GND | - | - | GND |
| 32 | SPOUT P | A.O | - | - | - |
| 33 | SPOUT N | A.O | - | - | - |
| 34 | VCCPA | VCC | VCC | - | - |
| 35 | HSOUT | A.O | - | - | - |
| 36 | LOUT | A.O | - | - | - |
| 37 | VCCA | VCC | VCC | - | - |
| 38 | LIN | A.I | - | - | - |
| 39 | LGS | A.O | - | - | - |
| 40 | DCIN | A.I | - | - | - |
| 41 | CIDIN | A.I | - | - | - |
| 42 | CIDIP | A.I | - | - | - |
| 43 | CIDO | A.O | - | - | - |
| 44 | HMGS | A.O | - | - | - |
| 45 | HMIN | A.I | - | - | - |
| 46 | GNDA | GND | - | - | GND |
| 47 | MIN | A.I | - | - | - |
| 48 | MGS | A.O | - | - | - |
| 49 | VREF | A.O | - | - | - |
| 50 | GNDPLL | GND | - | - | GND |

| Pin | Description | I/O | High | High_Z | Low |
|---|---|---|---|---|---|
| 51 | VCCPLL | VCC | VCC | - | - |
| 52 | VRTC | VCC | VCC | - | - |
| 53 | XOUT | A.O | - | - | - |
| 54 | XIN | A.I | - | - | - |
| 55 | GND | GND | - | - | GND |
| 56 | RESET | D.I | Normal | - | Reset |
| 57 | PDN | D.I | Power On | - | Power Down |
| 58 | FL_CE | D.O | Not | - | Active |
| 59 | IRQ_INT | D.I | Normal | - | Interrupt |
| 60 | CHG_DET | D.I | Off Charge | - | On Charge |
| 61 | FL_ALE | D.O | Latch | - | Not |
| 62 | FL_CLE | D.O | Latch | - | Not |
| 63 | FLASH2 | D.O | - | - | Normal |
| 64 | BELL | D.I | High | - | Low |
| 65 | NC | D.O | - | - | Normal |
| 66 | SP_LED | D.O | Off | - | On |
| 67 | C-ID_LED | D.O | Off | - | On |
| 68 | HANDSET | D.I | Headset In | - | Non |
| 69 | ADPCM_BCLK | D.I | High | - | Low |
| 70 | ADPCM_SYNC | D.I | High | - | Low |
| 71 | ADPCM_OUT | D.I | High | - | Low |
| 72 | ADPCM _IN | D.O | High | - | Low |
| 73 | CHG_CTL | D.O | - | Charge | Non Charge |
| 74 | GND | GND | - | - | GND |
| 75 | VCC | VCC | VCC | - | - |
| 76 | KEY IN | D.I | Key In | - | Non |
| 77 | KEY IN | D.I | Key In | - | Non |
| 78 | KEY IN | D.I | Key In | - | Non |
| 79 | KEY IN | D.I | Key In | - | Non |
| 80 | KEY IN | D.I | Key In | - | Non |
| 81 | KEY IN | D.I | Key In | - | Non |
| 82 | LEVEL_CNT | D.O | Not | - | Recording |
| 83 | FL_WP | D.O | Off | - | On |
| 84 | IO7 | D.O | High | - | Low |
| 85 | IO6 | D.O | High | - | Low |
| 86 | IO5 | D.O | High | - | Low |
| 87 | IO4 | D.O | High | - | Low |
| 88 | IO3 | D.O | High | - | Low |
| 89 | IO2 | D.O | High | - | Low |
| 90 | IO1 | D.O | High | - | Low |
| 91 | IO0 | D.O | High | - | Low |
| 92 | GND | GND | - | - | GND |
| 93 | VCC | VCC | VCC | - | - |
| 94 | RE | D.O | Active | - | Not |
| 95 | WE | D.O | Active | - | Not |
| 96 | UART_RX | D.I | High | - | Low |
| 97 | UART_TX | D.O | High | - | Low |
| 98 | LINE_SZ | D.O | On | - | Off |
| 99 | RLY | D.O | On | - | Off |
| 100 | ANS LED | D.O | Off | - | On |

# 16. CPU DATA (Handset)

## 16.1. IC201

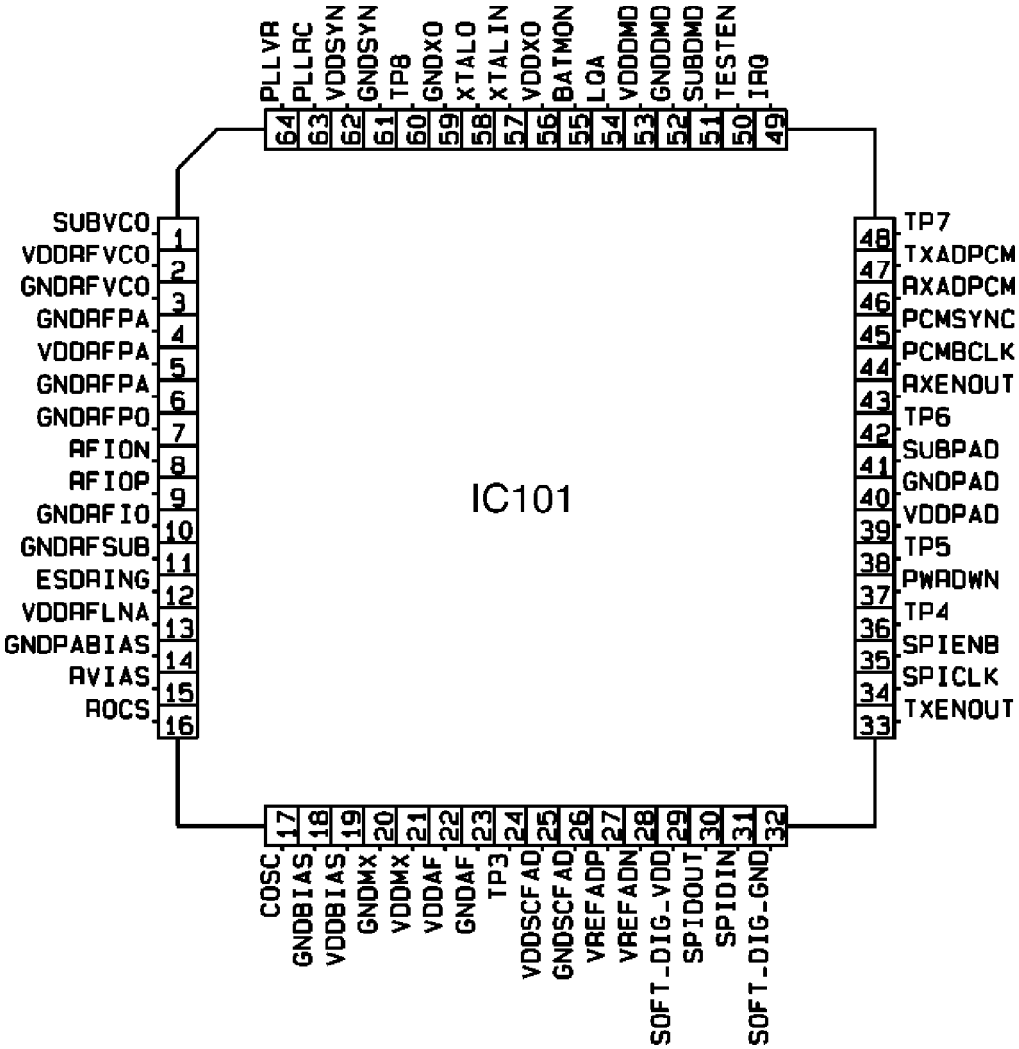



| Pin | Description | I/O | High | High_Z | Low |
|---|---|---|---|---|---|
| 1 | EEPROM-CS | D.O | Active | - | Not |
| 2 | LCD_PW_CTL | D.O | Off | - | On |
| 3 | MIC_SW | D.O | Bias Off | - | Bias On |
| 4 | LCD_CSB | D.O | Not | - | Active |
| 5 | LCD_RS | D.O | Data | - | Instruct |
| 6 | LCD_WR | D.O | Read | - | Write |
| 7 | LCD_RD | D.O | Active | - | Not |
| 8 | LCD_DA0 | D.O | High | - | Low |
| 9 | LCD_DA1 | D.O | High | - | Low |
| 10 | LCD_DA2 | D.O | High | - | Low |
| 11 | LCD_DA3 | D.O | High | - | Low |
| 12 | VCC | VCC | Vcc | - | - |
| 13 | GND | GND | - | - | GND |
| 14 | RF_PW_CTL | D.O | Off | - | On |
| 15 | BBIC PDN | D.O | Not | - | Active |
| 16 | KYE STROB | D.O | Active | Not | - |
| 17 | LCD_RESET | D.O | Not | - | Reset |
| 18 | KYE STROB | D.O | Active | Not | - |
| 19 | KYE STROB | D.O | Active | Not | - |
| 20 | KYE STROB | D.O | Active | Not | - |
| 21 | KYE STROB | D.O | Active | Not | - |
| 22 | KYE STROB | D.O | Active | Not | - |
| 23 | KYE STROB | D.O | Active | Not | - |
| 24 | RED LED | D.O | Off | - | On |
| 25 | SPI_OUT | D.O | High | - | Low |
| 26 | SPI_EN | D.O | Not | - | Active |
| 27 | SPI_CLK | D.O | High | - | Low |
| 28 | GND | - | - | - | GND |
| 29 | SPI_DIN | D.I | High | - | Low |
| 30 | GREEN LED | D.O | Off | - | On |
| 31 | GNDPA | GND | - | - | GND |
| 32 | OUTP | A.O | - | - | - |
| 33 | OUTN | A.O | - | - | - |
| 34 | VCCPA | VCC | VCC | - | - |
| 35 | HSOUT | A.O | - | - | - |
| 36 | LOUT | A.O | - | - | - |
| 37 | VCCA | VCC | VCC | - | - |
| 38 | LIN | A.I | - | - | - |
| 39 | LGS | A.O | - | - | - |
| 40 | DCIN | A.I | - | - | - |
| 41 | CIDIN | A.I | - | - | - |
| 42 | CIDIP | A.I | - | - | - |
| 43 | CIDO | A.O | - | - | - |
| 44 | HMGS | A.O | - | - | - |
| 45 | HMIN | A.I | - | - | - |
| 46 | GNDA | GND | - | - | GND |
| 47 | MIN | A.I | - | - | - |
| 48 | MGS | A.O | - | - | - |
| 49 | VREF | A.O | - | - | - |
| 50 | GNDPLL | GND | - | - | GND |

| Pin | Description | I/O | High | High_Z | Low |
|---|---|---|---|---|---|
| 51 | VCCPLL | VCC | VCC | - | - |
| 52 | VRTC | VCC | VCC | - | - |
| 53 | XOUT | A.O | - | - | - |
| 54 | XIN | A.I | - | - | - |
| 55 | GND | GND | - | - | GND |
| 56 | RESET | D.I | Normal | - | Reset |
| 57 | PDN | D.I | Power On | - | Power Down |
| 58 | NC | D.O | - | - | Normal |
| 59 | IRQ_INT | D.I | Normal | - | Interrupt |
| 60 | NC | D.O | - | - | Normal |
| 61 | NC | GND | - | - | Normal |
| 62 | NC | VCC | - | - | Normal |
| 63 | NC | D.O | - | - | Normal |
| 64 | HEAD_DET | D.I | Headset In | - | Non |
| 65 | LCD BL 1 | D.O | On | - | Off |
| 66 | LCD_BL_0 | D.O | On | - | Off |
| 67 | SP LED | D.O | Off | - | On |
| 68 | LIGHTED | D.O | On | - | Off |
| 69 | BCLK | D.I | High | - | Low |
| 70 | FSYNC | D.I | High | - | Low |
| 71 | ADPCM OUT | D.I | High | - | Low |
| 72 | ADPCM IN | D.O | High | - | Low |
| 73 | RF_RESET | D.O | Normal | - | Reset |
| 74 | GND | GND | - | - | GND |
| 75 | VCC | VCC | VCC | - | - |
| 76 | KEY IN | D.I | Key In | - | Non |
| 77 | KEY IN | D.I | Key In | - | Non |
| 78 | KEY IN | D.I | Key In | - | Non |
| 79 | KEY IN | D.I | Key In | - | Non |
| 80 | NC | D.O | - | - | Normal |
| 81 | CHG_DET | D.I | Off Charge | - | On Charge |
| 82 | PW CTL1 | D.O | - | pin2=Hi-Z:HighPower - | pin2=Hi-Z:LowPower pin2=L:SuperLowPower |
| 83 | PW CTL0 | D.O | pin1=H:HighPower pin1=L:LowPower | - | pin1=H:- pin1=L:SuperLowPower |
| 84 | NC | D.O | - | - | Normal |
| 85 | NC | D.O | - | - | Normal |
| 86 | NC | D.O | - | - | Normal |
| 87 | NC | D.O | - | - | Normal |
| 88 | NC | D.O | - | - | Normal |
| 89 | NC | D.O | - | - | Normal |
| 90 | NC | D.O | - | - | Normal |
| 91 | NC | D.O | - | - | Normal |
| 92 | GND | GND | - | - | GND |
| 93 | VCC | VCC | VCC | - | - |
| 94 | DRDN | VCC | VCC | - | - |
| 95 | DWRN | GND | - | - | GND |
| 96 | UART_RX | D.I | High | - | Low |
| 97 | UART_TX | D.O | High | - | Low |
| 98 | EEP_CLK | D.O | High | - | Low |
| 99 | EEP_DI | D.O | High | - | Low |
| 100 | EEP_DOUT | D.I | High | - | Low |

# 17. EXPLANATION OF IC TERMINALS (RF Unit, Base Unit)

## 17.1. IC101


IC101
1 SUBVCO
2 VDDRFVCO
3 GNDRFVCO
4 GNDRFPA
5 VDDRFPA
6 GNDRFPA
7 GNDRFPO
8 RFION
9 RFIOP
10 GNDRFIO
11 GNDRFSUB
12 ESDRING
13 VDDRFLNA
14 GNDPABIAS
15 RVIAS
16 ROCS
17 COSC
18 GNDBIAS
19 VDDBIAS
20 GNDMX
21 VDDMX
22 VDDAF
23 GNDAF
24 TP3
25 VDDSCFAD
26 GNDSCFAD
27 VREFADP
28 VREFADN
29 SOFT_DIG_VDD
30 SPIDOUT
31 SPIDIN
32 SOFT_DIG_GND
33 TXENOUT
34 SPICLK
35 SPIENB
36 TP4
37 PWRDWN
38 TP5
39 VDDPAD
40 GNDPAD
41 SUBPAD
42 TP6
43 RXENOUT
44 PCMBCLK
45 PCMSYNC
46 RXADPCM
47 TXADPCM
48 TP7
49 IRQ
50 TESTEN
51 SUBDMD
52 GNDDMD
53 VDDDMD
54 LOA
55 BATMON
56 VDDXO
57 XTALIN
58 XTALO
59 GNDXO
60 TP8
61 GNDSYN
62 VDDSYN
63 PLLRC
64 PLLVR

| Pin | Description | I/O |
|---|---|---|
| 1 | SUBVCO | GND |
| 2 | VDDRFVCO | VCC |
| 3 | GNDRFVCO | GND |
| 4 | GNDRFPA | GND |
| 5 | VDDRFPA | VCC |
| 6 | GNDRFPA | GND |
| 7 | GNDRFPO | GND |
| 8 | RF ION | I/O |
| 9 | RF IOP | I/O |
| 10 | GNDRFIO | GND |
| 11 | GNDRFSUB | GND |
| 12 | ESDRING | GND |
| 13 | VDDRFLNA | VCC |
| 14 | GNDPABIAS | GND |
| 15 | RBIAS | I |
| 16 | ROCS | I |
| 17 | COSC | I |
| 18 | GNDBIAS | GND |
| 19 | VDDBIAS | VCC |
| 20 | GNDMX | GND |
| 21 | VDDMX | VCC |
| 22 | VDDAF | VCC |
| 23 | GNDAF | GND |
| 24 | TP3 | O |
| 25 | VDDSCFAD | VCC |
| 26 | GNDSCFAD | GND |
| 27 | VREFADP | VCC |
| 28 | VREFADN | I |
| 29 | SOFT_DIG_VDD | VCC |
| 30 | SPIDOUT | D.O |
| 31 | SPIDIN | D.I |
| 32 | SOFT_DIG_GND | GND |

| Pin | Description | I/O |
|---|---|---|
| 33 | TXENOUT | D.O |
| 34 | SPICLK | D.I |
| 35 | SPIENB | D.I |
| 36 | RESET | D.I |
| 37 | PWRDWN | D.I |
| 38 | MCLKOUT | O |
| 39 | VDDPAD | VCC |
| 40 | GNDPAD | GND |
| 41 | SUBPAD | GND |
| 42 | TP6 | D.O |
| 43 | RXENOUT | D.O |
| 44 | PCMBCLK | D.O |
| 45 | PCMSYNC | D.O |
| 46 | RXADPCM | D.O |
| 47 | TXADPCM | D.I |
| 48 | TP7 | D.O |
| 49 | IRQ | D.O |
| 50 | TESTEN | D.I |
| 51 | XUBDMD | GND |
| 52 | GNDDMD | GND |
| 53 | VDDDMD | VCC |
| 54 | LQA | D.O |
| 55 | BATMON | I |
| 56 | VDDXO | VDD |
| 57 | XTALIN | I |
| 58 | XTALO | O |
| 59 | GNDXO | GND |
| 60 | TP8 | D.I |
| 61 | GNDSYN | GND |
| 62 | VDDSYN | VCC |
| 63 | PLLRC | O |
| 64 | PLLVR | I |

# 18. HOW TO REPLACE FLAT PACKAGE IC

## 18.1. Preparation

**- SOLDER**

**Sparkle Solder 115A-1, 115B-1 or Almit Solder KR-19, KR-19RMA**

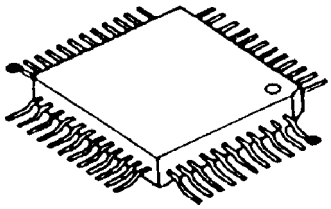
**- Soldering iron**

**Recommended power consumption will be between 30 W to 40 W. / Temperature of Copper Rod 662 ± 50°F (350 ± 10°C) / (An expert may handle between 60 W to 80 W iron, but beginner might damage foil by overheating.)**

**- Flux / HI115 Specific gravity 0.863 / (Original flux will be replaced daily.)**

## 18.2. Procedure

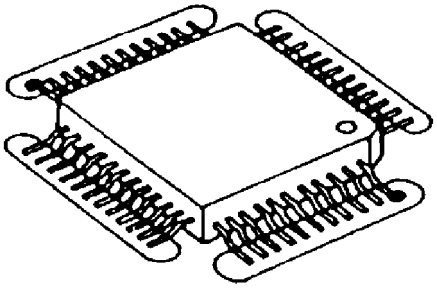
**1. Temporary fix FLAT PACKAGE IC by soldering on two marked 2 pins.**



● - - - - - - Temporary soldering point.

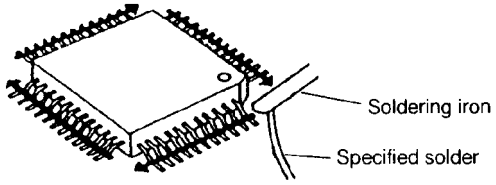
***Most important matter is accurate setting of IC to the corresponding soldering foil.**

**2. Apply flux for all pins of FLAT PACKAGE IC.**



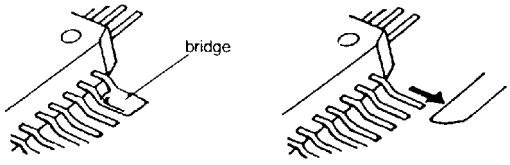
- - - - - - Flux

**3. Solder employing specified solder to direction of arrow, as sliding the soldering iron.**

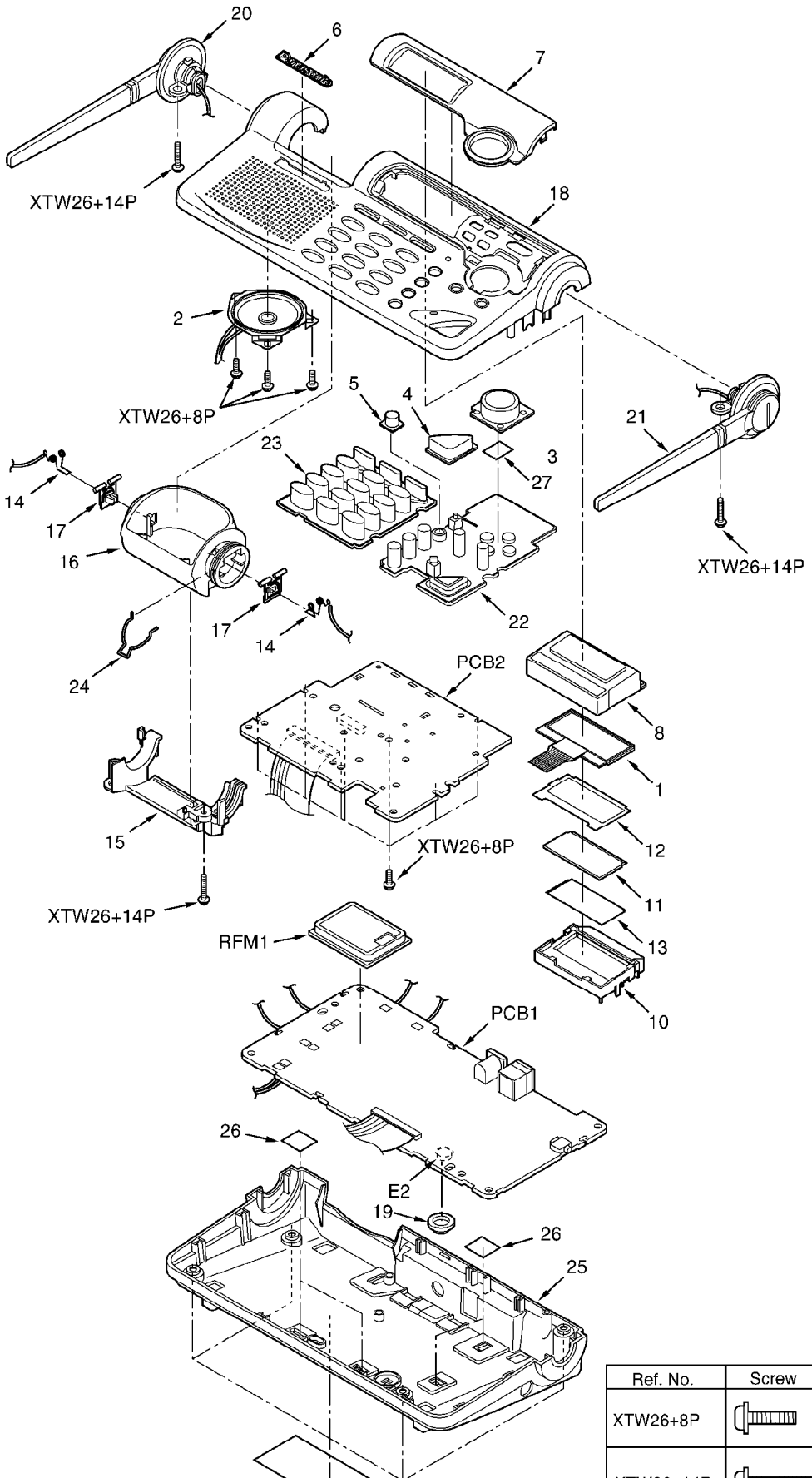


### 18.3. Modification Procedure of Bridge

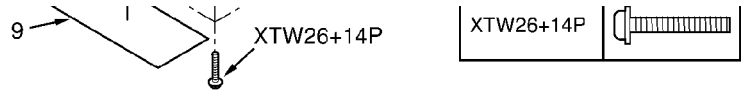
1. **Re-solder slightly on bridged portion.**
2. **Remove remained solder along pins employing soldering iron as shown in below figure.**



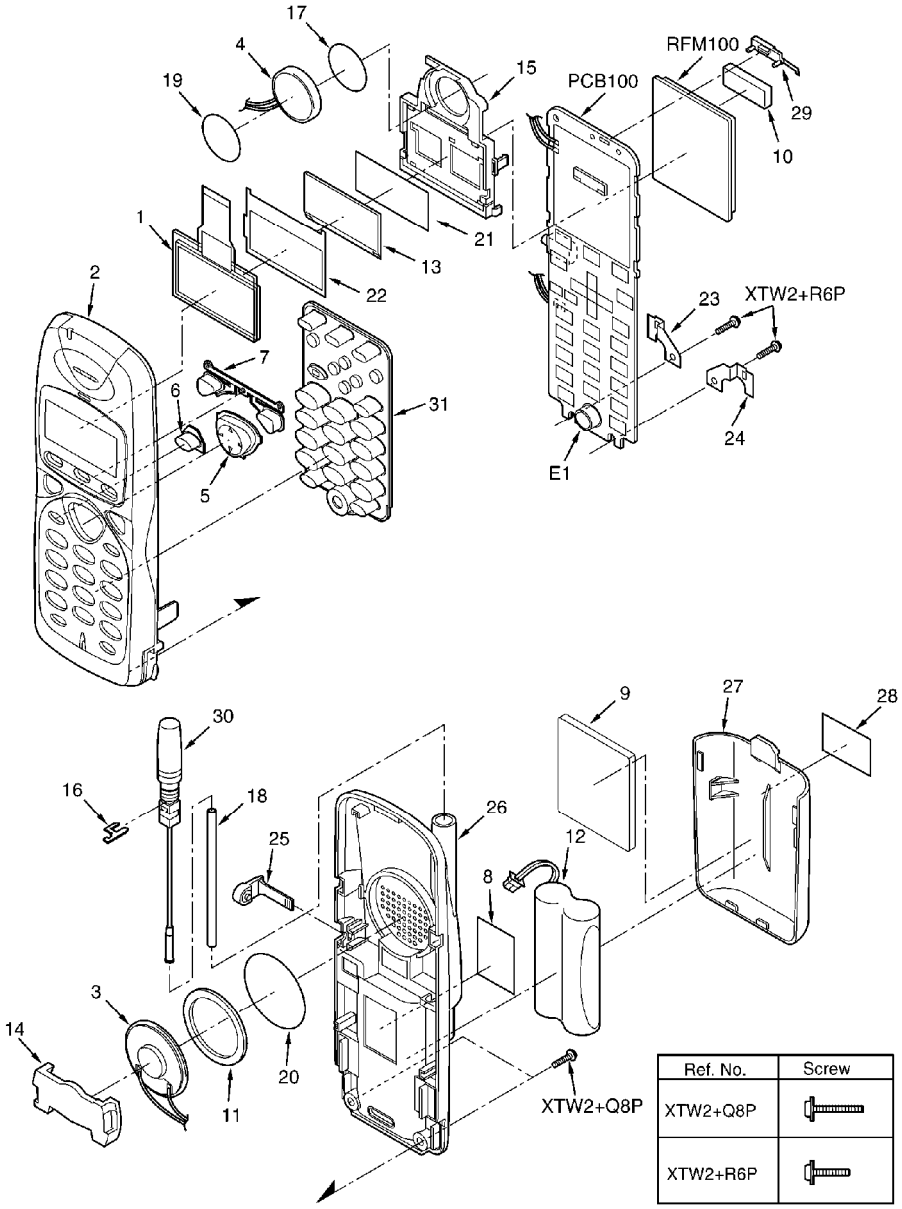

# 19. CABINET AND ELECTRICAL PARTS (Base Unit)



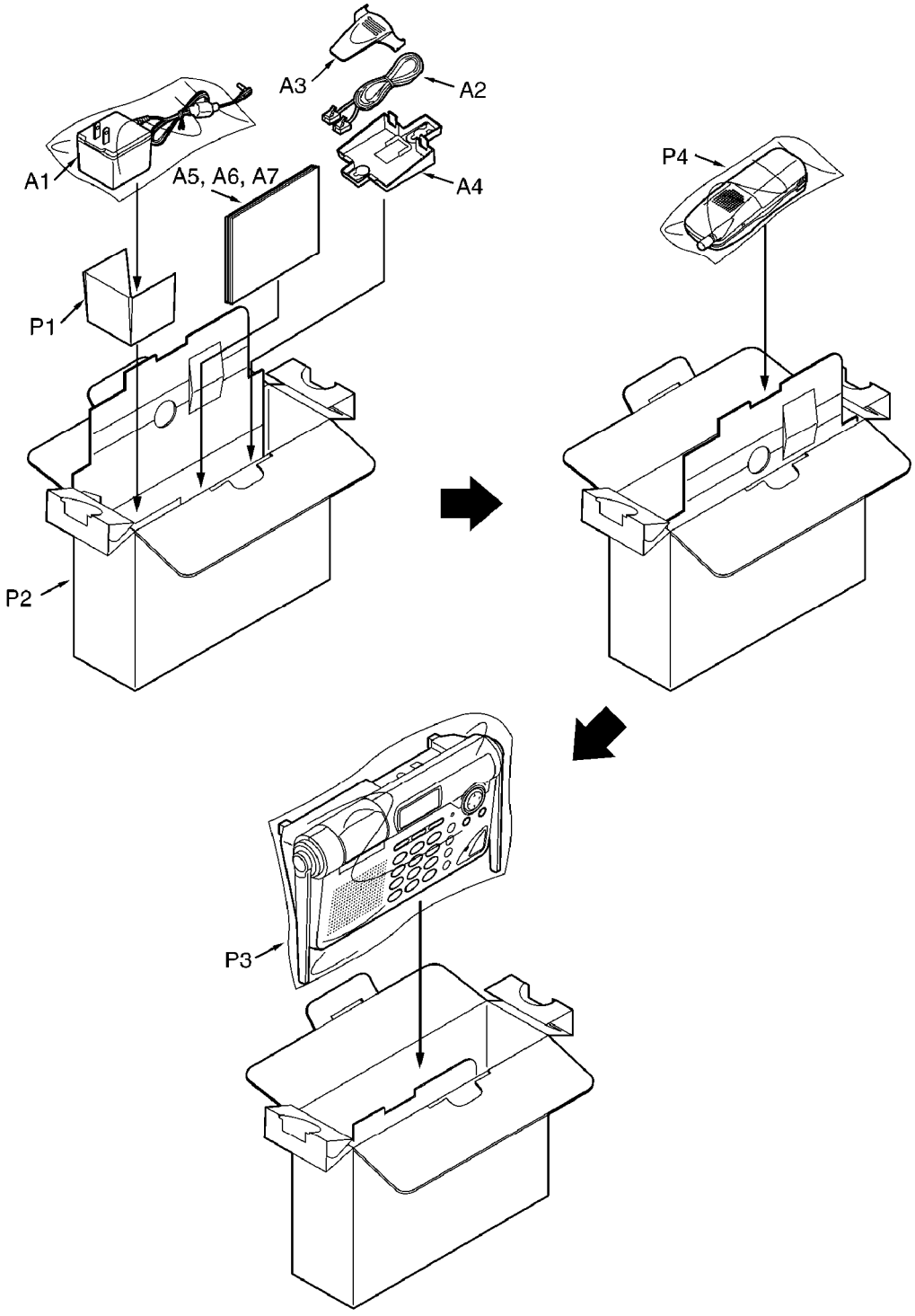

| Ref. No. | Screw |
|---|---|
| XTW26+8P | |
| | |




# 20. CABINET AND ELECTRICAL PARTS (Handset)




# 21. ACCESSORIES AND PACKING MATERIALS




# 22. REPLACEMENT PARTS LIST

**This replacement parts list are U.S.A. version only.**
**Note:**

## 1. RTL (Retention Time Limited)

**The marking (RTL) indicates that the Retention Time is limited for this item.**

**After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention.**
**After the end of this period, the assembly will no longer be available.**

2. **Important safety notice**
   **Components identified by a ⚠ mark special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.**
3. **The S mark indicates service standard parts and may differ from production parts.**
4. **RESISTORS & CAPACITORS**
   **Unless otherwise specified;**
   **All resistors are in ohms ( Ω ) K=1000 Ω , M=1000k Ω**
   **All capacitors are in MICRO FARADS ( μ F) P= μ μ F**
   ***Type & Wattage of Resistor**

Type

| | | |
|---|---|---|
| ERC:Solid<br>ERD:Carbon<br>PQRD:Carbon | ERX:Metal Film<br>ERG:Metal Oxide<br>ER0:Metal Film | PQ4R:Carbon<br>ERS:Fusible Resistor<br>ERF:Cement Resistor |

Wattege

| | | | | | |
|---|---|---|---|---|---|
| 10,16:1/8W | 14,25:1/4W | 12:1/2W | 1:1W | 2:2W | 3:3W |

*Type & Voltage of Capacitor

Type

| | |
|---|---|
| ECFD:Semi-Conductor<br>ECQS:Styrol<br>PQCUV:Chip<br>ECQMS:Mica | ECCD,ECKD,ECBT,PQCBC:Ceramic<br>ECQE,ECQV,ECQG:Polyester<br>ECEA,ECSZ:Electlytic<br>ECQP:Polypropylene |

Voltage

| ECQ Type | ECQG<br>ECQV Type | ECSZ Type | Others | |
|---|---|---|---|---|
| 1H:50V<br>2A:100V<br>2E:250V<br>2H:500V | 05:50V<br>1:100V<br>2:200V | 0F:3.15V<br>1A:10V<br>1V:35V<br>0J:6.3V | 0J :6.3V<br>1A :10V<br>1C :16V<br>1E,25:25V | 1V :35V<br>50,1H:50V<br>1J :63V<br>2A :100V |

## 22.1. Base Unit

### 22.1.1. CABINET AND ELECTRICAL PARTS

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| 1 | PQADGP097A0 | LIQUID CRYSTAL DISPLAY | |
| 2 | PQAS57P03Y | SPEAKER | |
| 3 | PQBC10310Z1 | NAVIGATOR BUTTON | S |
| 4 | PQBC10311Z1 | SP PHONE BUTTON | S |
| 5 | PQBC10312Z1 | CID BUTTON | S |
| 6 | PQGB7Y | BADGE | |
| 7 | PQGG10113Z1 | GRILLE | S |
| 8 | PQGP10171Z1 | LCD PANEL | S |
| 9 | PQGT14335Z | NAME PLATE | |
| 10 | PQHR10785Z | LCD HOLDER | |
| 11 | PQHR10787Z | LCD PLATE | |
| 12 | PQHX10961Z | LCD COVER SHEET | |
| 13 | PQHX10989Z | REFLECTOR SHEET | |
| 14 | PQJT10170Z | CHARGE TERMINAL | |
| 15 | PQKE10112Z1 | CHARGE CASE HOLDER | S |
| 16 | PQKE10107Z1 | CHARGE CASE | S |
| 17 | PQKE10111Z1 | CHARGE TERMINAL CASE | S |
| 18 | PQKM10460Z1 | UPPER CABINET | S |
| 19 | PQMG10025Z | CUSHION, RUBBER (MIC) | |
| 20 | PQSA10109Z | ANTENNA | |
| 21 | PQSA10110Z | ANTENNA | |
| 22 | PQSX10154Z | FUNCTION RUBBER BUTTON | |
| 23 | PQSX10153Z | 12 KEY RUBBER BUTTON | |
| 24 | PQUS10263Z | CRICK SPRING | |
| 25 | PQYF10182X1 | LOWER CABINET | S |
| 26 | PQHS10466Z | HIMERON TAPE | |
| 27 | PQHS333Z | HIMERON TAPE | |

## 22.1.2. MAIN P.C. BOARD PARTS

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| PCB1 | PQWP1TG2650H | MAIN P.C. BOARD ASS'Y (RTL) | |
| | | (ICS) | |
| IC301 | PQVIXCF4502P | IC | |
| IC302 | PQVINJM2360M | IC | |
| IC331 | PQVIPS3432UT | IC | |
| IC501 | PQVI16569ADA | IC | |
| IC751 | PQWITG2650NH | IC | S |
| IC752 | PQVITC7S08FU | IC | |
| IC753 | PQVISPM3204T | IC | |
| IC754 | PQVITC7W74U | IC | |
| | | (TRANSISTORS) | |
| Q101 | 2SD1819A | TRANSISTOR(SI) | |
| Q115 | 2SD1819A | TRANSISTOR(SI) | |
| Q121 | 2SA1625 | TRANSISTOR(SI) | |
| Q122 | PQVT2N6517CA | TRANSISTOR(SI) | |
| Q131 | 2SC2120 | TRANSISTOR(SI) | |
| Q302 | PQVTXP132A11 | TRANSISTOR(SI) | |
| Q304 | 2SD1664Q | TRANSISTOR(SI) | |
| Q321 | 2SD1994A | TRANSISTOR(SI) | |
| Q341 | 2SD1819A | TRANSISTOR(SI) | |
| Q342 | 2SD1819A | TRANSISTOR(SI) | |
| Q343 | 2SD1819A | TRANSISTOR(SI) | |

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| Q371 | 2SD2136 | TRANSISTOR(SI) | |
| Q381 | 2SD1819A | TRANSISTOR(SI) | |
| Q445 | 2SD1819A | TRANSISTOR(SI) | |
| Q461 | 2SD1819A | TRANSISTOR(SI) | |
| Q601 | 2SD1664Q | TRANSISTOR(SI) | |
| Q725 | 2SD601A | TRANSISTOR(SI) | |
| Q751 | UN5213 | TRANSISTOR(SI) | S |
| Q752 | 2SD1758Q | TRANSISTOR(SI) | |
| Q753 | PQVTDTC114EU | TRANSISTOR(SI) | |
| Q754 | PQVTDTC143E | TRANSISTOR(SI) | |
| Q755 | UN5213 | TRANSISTOR(SI) | S |
| | | (DIODES) | |
| D101 | PQVDS1ZB60F1 | DIODE(SI) | |
| D103 | MA111 | DIODE(SI) | |
| D121 | PQVDRLZ20A | DIODE(SI) | |
| D122 | PQVDRLZ2R0 | DIODE(SI) | |
| D201 | MA111 | DIODE(SI) | |
| D202 | MA111 | DIODE(SI) | |
| D302 | PQVDSS24 | DIODE(SI) | |
| D306 | PQVDHRU0302A | DIODE(SI) | |
| D313 | MA8047 | DIODE(SI) | |
| D314 | MA8043 | DIODE(SI) | |
| D315 | PQVDHRU0302A | DIODE(SI) | |
| D321 | MA8047 | DIODE(SI) | |
| D331 | MA8036H | DIODE(SI) | |
| D360 | MA8051 | DIODE(SI) | |
| D371 | MA111 | DIODE(SI) | |
| D376 | MA8220 | DIODE(SI) | |
| D377 | MA8220 | DIODE(SI) | |
| D445 | MA153 | DIODE(SI) | |
| D511 | PQVDHRU0203A | DIODE(SI) | |
| D514 | MA111 | DIODE(SI) | |
| D515 | MA111 | DIODE(SI) | |
| D719 | MA111 | DIODE(SI) | |
| D720 | MA111 | DIODE(SI) | |
| D721 | MA8051 | DIODE(SI) | |
| D722 | MA8051 | DIODE(SI) | |
| D723 | MA8033 | DIODE(SI) | |
| | | (COILS) | |
| L101 | PQLQXF330K | COIL | |
| L102 | PQLQXF330K | COIL | |
| L201 | PQLQR2KA213 | COIL | |
| L202 | PQLQR2KA213 | COIL | |
| L203 | PQLQR2KA213 | COIL | |
| L204 | PQLQR2KA213 | COIL | |
| L302 | PQLE139 | COIL | |
| L350 | PQLQXF100K | COIL | |
| L372 | PQLQR2K1A102 | COIL | |
| L373 | PQLQR2K1A102 | COIL | |
| L374 | PQLQR2K1A102 | COIL | |
| L375 | PQLQR2K1A102 | COIL | |
| L376 | PQLQXF3R3K | COIL | |
| L377 | PQLQXF3R3K | COIL | |
| L515 | PQLQR2K1A102 | COIL | |

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| L715 | PQLQR2K1A102 | COIL | |
| L716 | PQLQR2KA213 | COIL | |
| L901 | PQLQR2KA213 | COIL | |
| L902 | PQLQR2KA213 | COIL | |
| L904 | PQLQR2KA213 | COIL | |
| L906 | PQLQR2KA213 | COIL | |
| | | (JACKS) | |
| CN101 | PQJJ1T008X | JACK/SOCKET | |
| CN102 | PQJJ1T022Z | JACK/SOCKET | |
| CN701 | PQJJ1C001Z | JACK/SOCKET | |
| | | (VARISTORS) | |
| SA101 | PQVDDSS301L | VARISTOR | |
| SA102 | PQVDDSS301L | VARISTOR | |
| | | (BATTERY TERMINALS) | |
| G601 | PQJT10152Z | BATTERY TERMINAL | |
| G602 | PQJT10152Z | BATTERY TERMINAL | |
| G603 | PQJT10152Z | BATTERY TERMINAL | |
| G604 | PQJT10152Z | BATTERY TERMINAL | |
| G605 | PQJT10152Z | BATTERY TERMINAL | |
| G606 | PQJT10152Z | BATTERY TERMINAL | |
| | | (OTHERS) | |
| E1 | PQJE10107Z | CONNECTOR | |
| E2 | PQJM150Z | MICROPHONE | |
| CN702 | PQJS30B37Z | CONNECTOR | |
| RA702 | EXRV8V221JV | RESISTOR ALLAY | |
| X501 | PQVCK4096N9Z | CRYSTAL OSCILLATOR | |
| P101 | PQRPAR390N | THERMISTOR | S |
| | | (RESISTORS) | |
| R103 | ERJ3GEYJ104 | 100k | |
| R104 | ERJ3GEYJ104 | 100k | |
| R106 | ERJ3GEYJ472 | 4.7k | |
| R107 | ERJ3GEYJ473 | 47k | |
| R111 | ERJ3GEYJ394 | 390k | |
| R112 | ERJ3GEYJ394 | 390k | |
| R113 | ERJ3GEYJ472 | 4.7k | |
| R115 | ERJ3GEYJ125 | 1.2M | |
| R116 | ERDS1VJ106 | 10M | |
| R117 | ERJ3GEYJ335 | 3.3M | |
| R121 | ERJ3GEYJ104 | 100k | |
| R122 | ERJ3GEYJ103 | 10k | |
| R123 | ERJ3GEYJ153 | 15k | |
| R124 | ERJ3GEYJ473 | 47k | |
| R128 | ERJ3GEYJ103 | 10k | |
| R131 | ERJ3GEYJ393 | 39k | |
| R132 | ERJ3GEYJ222 | 2.2k | |
| R136 | ERDS1TJ330 | 33 | S |
| R138 | ERJ3GEYJ470 | 47 | |
| R139 | ERJ3GEYJ122 | 1.2k | |
| R140 | ERJ3GEYJ152 | 1.5k | |
| R201 | ERJ3GEYJ103 | 10k | |
| R202 | ERJ3GEY0R00 | 0 | |
| R203 | ERJ3GEY0R00 | 0 | |
| R313 | ERJ3GEYJ221 | 220 | |
| R314 | ERJ3GEYJ221 | 220 | |

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| R315 | ERX1SJR15 | 0.15 | |
| R316 | ERJ3GEYJ102 | 1k | |
| R317 | ERJ3GEYF123 | 12k | |
| R318 | ERJ3GEYF473 | 47k | |
| R319 | ERJ3GEY0R00 | 0 | |
| R320 | ERDS1TJ331 | 330 | S |
| R321 | ERJ3GEYJ391 | 390 | |
| R322 | ERJ3GEYJ102 | 1k | |
| R331 | ERJ3GEYJ273 | 27k | |
| R332 | ERJ3GEYJ683 | 68k | |
| R333 | ERJ3GEYJ103 | 10k | |
| R335 | ERJ3GEYJ561 | 560 | |
| R336 | ERJ3GEYJ563 | 56k | |
| R341 | ERJ3GEYJ473 | 47k | |
| R342 | ERJ3GEYJ224 | 220k | |
| R344 | ERJ3GEYJ104 | 100k | |
| R345 | ERJ3GEYJ224 | 220k | |
| R371 | ERJ3GEYJ121 | 120 | |
| R372 | ERJ3GEYJ561 | 560 | |
| R373 | ERJ3GEYJ180 | 18 | |
| R374 | ERJ3GEYJ180 | 18 | |
| R375 | ERJ3GEYJ180 | 18 | |
| R376 | ERJ3GEYJ180 | 18 | |
| R377 | ERDS1TJ820 | 82 | S |
| R378 | ERDS1TJ820 | 82 | S |
| R381 | ERJ3GEYJ563 | 56k | |
| R382 | ERJ3GEYJ223 | 22k | |
| R383 | ERJ3GEYJ102 | 1k | |
| R384 | ERJ3GEYJ104 | 100k | |
| R385 | ERJ3GEY0R00 | 0 | |
| R386 | ERJ3GEYJ102 | 1k | |
| R411 | ERJ3GEYJ394 | 390k | |
| R412 | ERJ3GEYJ394 | 390k | |
| R413 | ERJ3GEYJ103 | 10k | |
| R414 | ERJ3GEYJ103 | 10k | |
| R415 | ERJ3GEYJ273 | 27k | |
| R431 | ERJ3GEYJ222 | 2.2k | |
| R442 | ERJ3GEYJ103 | 10k | |
| R443 | ERJ3GEYJ153 | 15k | |
| R444 | ERJ3GEYJ332 | 3.3k | |
| R445 | ERJ3GEYJ563 | 56k | |
| R446 | ERJ3GEYJ105 | 1M | |
| R447 | ERJ3GEYJ221 | 220 | |
| R448 | ERJ3GEYJ332 | 3.3k | |
| R450 | ERJ3GEYJ152 | 1.5k | |
| R461 | ERJ3GEYJ150 | 15 | |
| R462 | ERJ3GEYJ392 | 3.9k | |
| R464 | ERJ3GEYJ474 | 470k | |
| R465 | ERJ3GEYJ390 | 39 | |
| R466 | ERJ3GEY0R00 | 0 | |
| R501 | ERJ3GEYJ105 | 1M | |
| R502 | ERJ3GEYJ331 | 330 | |
| R601 | ERJ3GEY0R00 | 0 | |
| R705 | ERJ3GEYJ101 | 100 | |

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| R706 | ERJ3GEYJ101 | 100 | |
| R707 | ERJ3GEYJ472 | 4.7k | |
| R715 | ERJ3GEY0R00 | 0 | |
| R722 | ERJ3GEYJ392 | 3.9k | |
| R723 | ERJ3GEYJ102 | 1k | |
| R724 | ERJ3GEYJ562 | 5.6k | |
| R725 | ERJ3GEYJ821 | 820 | |
| R726 | ERJ3GEYJ392 | 3.9k | |
| R727 | ERJ3GEYJ274 | 270k | |
| R728 | ERJ3GEYJ102 | 1k | |
| R730 | ERJ3GEYJ821 | 820 | |
| R731 | ERJ3GEYJ221 | 220 | |
| R732 | ERJ3GEYJ102 | 1k | |
| R733 | ERJ3GEYJ181 | 180 | |
| R734 | ERJ3GEYJ181 | 180 | |
| R735 | ERJ3GEYJ181 | 180 | |
| R751 | ERJ3GEYJ104 | 100k | |
| R752 | ERJ3GEYJ104 | 100k | |
| R757 | ERJ3GEYJ221 | 220 | |
| R776 | ERJ3GEYJ102 | 1k | |
| R777 | ERJ3GEYJ102 | 1k | |
| R779 | ERJ3GEYJ333 | 33k | |
| R780 | ERJ3GEYJ103 | 10k | |
| R785 | ERJ3GEYJ103 | 10k | |
| R786 | ERJ3GEYJ104 | 100k | |
| R787 | ERJ3GEYJ104 | 100k | |
| R788 | ERJ3GEY0R00 | 0 | |
| R789 | ERJ3GEYJ473 | 47k | |
| C433 | ERJ3GEYJ822 | 8.2k | |
| L205 | ERJ3GEY0R00 | 0 | |
| L206 | ERJ3GEY0R00 | 0 | |
| L207 | ERJ3GEY0R00 | 0 | |
| L208 | ERJ3GEY0R00 | 0 | |
| L209 | ERJ3GEY0R00 | 0 | |
| L210 | ERJ3GEY0R00 | 0 | |
| L211 | ERJ3GEY0R00 | 0 | |
| L212 | ERJ3GEY0R00 | 0 | |
| L213 | ERJ3GEY0R00 | 0 | |
| L214 | ERJ3GEY0R00 | 0 | |
| L215 | ERJ3GEY0R00 | 0 | |
| L216 | ERJ3GEY0R00 | 0 | |
| L217 | ERJ3GEY0R00 | 0 | |
| L218 | ERJ3GEY0R00 | 0 | |
| L219 | ERJ3GEY0R00 | 0 | |
| L511 | PQ4R10XJ000 | 0 | S |
| | | (CAPACITORS) | |
| C101 | ECKD2H681KB | 680P | S |
| C102 | ECKD2H681KB | 680P | S |
| C103 | PQCUV1H154KR | 0.15 | |
| C104 | PQCUV1H154KR | 0.15 | |
| C106 | PQCUV1A684KB | 0.68 | |
| C111 | ECUV1H681JCV | 680P | S |
| C112 | ECUV1H681JCV | 680P | S |
| C115 | ECUV1H103KBV | 0.01 | |

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| C121 | ECUV1H103KBV | 0.01 | S |
| C122 | ECUV1H070CCV | 7P | |
| C123 | ECUV1H070CCV | 7P | |
| C131 | ECUV1H070CCV | 7P | |
| C132 | ECUV1H103KBV | 0.01 | |
| C134 | ECEA1HKA010 | 1 | |
| C135 | ECUV1H070CCV | 7P | |
| C139 | ECEA1CKS100 | 10 | S |
| C140 | ECUV1C473KBV | 0.047 | |
| C150 | ECUV1H102KBV | 0.001 | |
| C151 | ECUV1H103KBV | 0.01 | S |
| C152 | ECUV1C104ZFV | 0.1 | |
| C160 | ECUV1H070CCV | 7P | |
| C161 | ECUV1H070CCV | 7P | |
| C162 | ECUV1H070CCV | 7P | |
| C163 | ECUV1H070CCV | 7P | |
| C302 | ECUV1C104ZFV | 0.1 | |
| C303 | ECUV1C104ZFV | 0.1 | |
| C304 | ECEA0JU220 | 22 | |
| C306 | ECEA1AU102 | 1000 | |
| C312 | ECEA0JKS101 | 100 | |
| C313 | ECUV1A105ZFV | 1 | |
| C314 | ECEA0JKS470 | 47 | |
| C315 | ECUV1C104ZFV | 0.1 | |
| C316 | EEUFC1E221 | 220P | |
| C318 | ECUV1H221JCV | 220P | |
| C319 | EEUFC1A471 | 470P | |
| C320 | ECUV1C104ZFV | 0.1 | |
| C341 | ECUV1H102KBV | 0.001 | |
| C342 | ECUV1H102KBV | 0.001 | |
| C344 | ECUV1H681JCV | 680P | S |
| C345 | ECUV1C104KBV | 0.1 | |
| C371 | ECUV1C104ZFV | 0.1 | |
| C372 | ECUV1H471JCV | 470P | S |
| C411 | ECUV1H121JCV | 120P | |
| C412 | ECUV1A105ZFV | 1 | |
| C413 | ECUV1H121JCV | 120P | |
| C415 | ECUV1A105ZFV | 1 | |
| C431 | ECUV1H272KBV | 0.0027 | |
| C432 | ECUV1C104KBV | 0.1 | |
| C441 | ECUV1A224KBV | 0.22 | |
| C442 | ECUV1A224KBV | 0.22 | |
| C443 | ECUV1H101JCV | 100P | |
| C444 | ECUV1C104KBV | 0.1 | |
| C445 | ECEA1CKS100 | 10 | S |
| C446 | ECUV1H070CCV | 7P | |
| C447 | ECUV1H070CCV | 7P | |
| C461 | ECUV1C104ZFV | 0.1 | |
| C462 | ECUV1H070CCV | 7P | |
| C463 | ECUV1C683KBV | 0.068 | |
| C464 | ECUV1H070CCV | 7P | |
| C467 | ECUV1H070CCV | 7P | |
| C501 | ECEA0JU102 | 1000 | |
| C502 | ECUV1C104ZFV | 0.1 | |

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| C503 | ECUV1C104ZFV | 0.1 | |
| C504 | ECUV1C104ZFV | 0.1 | |
| C505 | ECUV1C104ZFV | 0.1 | |
| C506 | ECUV1H100DCV | 10P | S |
| C507 | ECUV1H100DCV | 10P | S |
| C511 | ECEA1AU101 | 100 | S |
| C512 | ECUV1C104ZFV | 0.1 | |
| C515 | ECEA0JU220 | 22 | |
| C516 | ECUV1C104ZFV | 0.1 | |
| C601 | ECEA1AU221 | 220 | S |
| C604 | ECEA0JU471 | 470 | |
| C607 | ECUV1C104ZFV | 0.1 | |
| C700 | ECUV1H681JCV | 680P | S |
| C701 | ECUV1H101JCV | 100P | |
| C703 | ECUV1H101JCV | 100P | |
| C706 | ECUV1H471JCV | 470P | S |
| C707 | ECUV1H471JCV | 470P | S |
| C708 | ECUV1H471JCV | 470P | S |
| C709 | ECUV1H471JCV | 470P | S |
| C711 | ECEA0JU331 | 330 | |
| C719 | ECUV1H680JCV | 68P | |
| C720 | ECUV1H680JCV | 68P | |
| C722 | ECEA1HKS4R7 | 4.7 | S |
| C723 | ECUV1H103KBV | 0.01 | S |
| C724 | ECUV1A224KBV | 0.22 | |
| C725 | ECUV1A224KBV | 0.22 | |
| C726 | ECUV1C104KBV | 0.1 | |
| C727 | ECUV1H221JCV | 220P | |
| C728 | ECUV1H102KBV | 0.001 | |
| C729 | ECUV1C104ZFV | 0.1 | |
| C730 | ECUV1H221JCV | 220P | |
| C736 | ECUV1H221JCV | 220P | |
| C737 | ECUV1H221JCV | 220P | |
| C738 | ECUV1H221JCV | 220P | |
| C739 | ECUV1H221JCV | 220P | |
| C740 | ECUV1H221JCV | 220P | |
| C741 | ECUV1H471JCV | 470P | S |
| C742 | ECUV1H471JCV | 470P | S |
| C743 | ECUV1H471JCV | 470P | S |
| C744 | ECUV1H471JCV | 470P | S |
| C745 | ECUV1H471JCV | 470P | S |
| C746 | ECUV1H471JCV | 470P | S |
| C747 | ECUV1H471JCV | 470P | S |
| C748 | ECUV1H471JCV | 470P | S |
| C750 | ECUV1H471JCV | 470P | S |
| C751 | ECUV1H471JCV | 470P | S |
| C753 | ECUV1H680JCV | 68P | |
| C754 | ECUV1H680JCV | 68P | |
| C755 | ECUV1H680JCV | 68P | |
| C756 | ECUV1H680JCV | 68P | |
| C757 | ECUV1H680JCV | 68P | |
| C759 | ECUV1H1R5CCV | 1.5 | |
| C760 | ECUV1H070CCV | 7P | |
| C761 | ECUV1H070CCV | 7P | |

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| C763 | ECUV1H070CCV | 7P | |
| C764 | ECUV1H070CCV | 7P | |
| C766 | ECUV1H1R5CCV | 1.5 | |
| C767 | ECUV1H1R5CCV | 1.5 | |
| C768 | ECUV1H1R5CCV | 1.5 | |
| C769 | ECUV1H1R5CCV | 1.5 | |
| C770 | ECUV1H1R5CCV | 1.5 | |
| C771 | ECUV1H1R5CCV | 1.5 | |
| C772 | ECUV1H1R5CCV | 1.5 | |
| C773 | ECUV1H1R5CCV | 1.5 | |
| C774 | ECUV1H1R5CCV | 1.5 | |
| C775 | ECUV1H1R5CCV | 1.5 | |
| C776 | ECUV1H1R5CCV | 1.5 | |
| C777 | ECUV1H1R5CCV | 1.5 | |
| C778 | ECUV1H1R5CCV | 1.5 | |
| C781 | ECEA0JU220 | 22 | |
| C782 | ECUV1C104KBV | 0.1 | |
| C785 | ECUV1H470JCV | 47P | |
| C786 | ECUV1H330JCV | 33P | |
| C787 | ECUV1H330JCV | 33P | |
| C788 | ECUV1H471JCV | 470P | S |
| C790 | ECUV1A105ZFV | 1 | |
| C791 | ECUV1H100DCV | 10P | S |
| C792 | ECUV1H100DCV | 10P | S |
| C793 | ECUV1C104ZFV | 0.1 | |
| C794 | ECUV1C104ZFV | 0.1 | |
| C795 | ECUV1H121JCV | 120P | |
| C796 | ECUV1H0R5CCV | 0.5 | |
| C797 | ECUV1H0R5CCV | 0.5 | |
| C798 | ECUV1H0R5CCV | 0.5 | |

## 22.1.3. OPERATIONAL P.C.BOARD ASS'Y(RTL)

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| PCB2 | PQWP2TG2650H | OPERATIONAL P.C.BOARD ASS'Y(RTL) | |
| | | (TRANSISTOR) | |
| Q801 | PQVTDTA143EU | TRANSISTOR(SI) | |
| Q802 | PQVTDTA143EU | TRANSISTOR(SI) | |
| | | (DIODES) | |
| D801 | MA111 | DIODE(SI) | |
| D802 | MA111 | DIODE(SI) | |
| | | (LEDS) | |
| LED801 | PQVDFA1105W | LED | |
| LED802 | PQVDFA1105W | LED | |
| LED803 | PQVDFA1105W | LED | |
| LED804 | LNJ211R8ARU | LED | |
| LED805 | LNJ211R8ARU | LED | |
| LED807 | LNJ211R8ARU | LED | |
| LED811 | PQVDHPY1105W | LED | |
| LED812 | PQVDHPY1105W | LED | |
| LED813 | PQVDHPY1105W | LED | |
| | | (CONNECTORS) | |
| CN801 | PQJS30B37Z | CONNECTOR | |
| CN802 | PQJS22B11Z | CONNECTOR | |
| | | (RESISTORS) | |
| R801 | ERJ3GEYJ101 | 100 | |
| R802 | ERJ3GEYJ330 | 33 | |
| R803 | ERJ3GEYJ101 | 100 | |
| R804 | ERJ3GEYJ330 | 33 | |
| R805 | ERJ3GEYJ101 | 100 | |
| R806 | ERJ3GEYJ330 | 33 | |
| R807 | ERJ3GEYJ391 | 390 | |
| R808 | ERJ3GEYJ391 | 390 | |
| R810 | ERJ3GEYF824 | 820K | |
| R811 | ERJ3GEYF434 | 430K | |
| R814 | ERJ3GEYJ391 | 390 | |
| | | (CAPACITORS) | |
| C801 | ECUV1A474KBV | 0.47 | |
| C802 | ECUV1C104ZFV | 0.1 | |
| C803 | ECUV1C104ZFV | 0.1 | |
| C804 | ECUV1C104ZFV | 0.1 | |
| C805 | ECUV1C104ZFV | 0.1 | |
| C806 | ECUV1C104ZFV | 0.1 | |
| C807 | ECUV1A474KBV | 0.47 | |
| C808 | ECUV1A474KBV | 0.47 | |

### 22.1.4. RF UNIT PARTS

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| RFM1 | PQLP10237Z | RF BLOCK | |

## 22.2. Handset

### 22.2.1. CABINET AND ELECTRICAL PARTS

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| 1 | PQADGP096B0 | LIQUID CRYSTAL DISPLAY | |
| 2 | PQYMTG2650NR | FRONT CABINET ASS'Y | |
| 3 | PQAS3P07Y | SPEAKER | |
| 4 | PQAS15P01Z | SPEAKER | |
| 5 | PQBC10313Z1 | NAVIGATOR BUTTON | S |
| 6 | PQBC10314Z1 | SP PHONE BUTTON | S |
| 7 | PQBX10343Z1 | FUNCTION BUTTON | S |
| 8 | PQGT14361Z | NAME PLATE | |
| 9 | PQHE10119Z | CUSHION | |
| 10 | PQHG10610Z | CUSHION | |
| 11 | PQHG10589Y | SP RUBBER SHEET | |
| 12 | PQHHR150SVC | BATTERY | S |
| 13 | PQHR10781Z | LCD PLATE | |
| 14 | PQHR10778Z | SP HOLDER | |
| 15 | PQHR10779Z | LCD HOLDER | |
| 16 | PQHR10839Z | ANTENNA HOLDER | |
| 17 | PQHR10834Z | RECEIVER HOLDER | |
| 18 | PQHR10840Z | ANTENNA COVER | |
| 19 | PQHS10458Z | SPEAKER NET | |
| 20 | PQHS10457Z | SPEAKER NET | |
| 21 | PQHX10963Y | LCD REFRECTOR SHEET | |
| 22 | PQHX10962Z | LCD COVER SHEET | |
| 23 | PQJT10168Y | CHARGE TERMINAL (L) | |
| 24 | PQJT10169Y | CHARGE TERMINAL (R) | |
| 25 | PQKE10108Z1 | E/P CAP | S |
| 26 | PQKF10494Z1 | REAR CABINET | S |
| 27 | PQKK10108Z1 | BATTERY COVER | S |
| 28 | PQQT22128Y | CHARGE LABEL | |
| 29 | PQSA10114Z | ANTENNA | |
| 30 | PQSA10111Z | ANTENNA | |
| 31 | PQSX10155Z | RUBBER SWITCH | |

## 22.2.2. MAIN P.C. BOARD PARTS

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| PCB100 | PQWPTG2650NR | MAIN P.C.BOARD ASS'Y(RTL) | |
| | | (ICS) | |
| IC201 | PQVI16107AFA | IC | |
| IC202 | PQWITG2650NR | IC | |
| IC203 | PQVIC61CC20N | IC | |
| IC204 | PQVIXCR3302M | IC | |
| IC205 | PQVIC61CC22N | IC | |
| IC206 | PQVIC68B102M | IC | |
| IC207 | PQVIMM1385EN | IC | |
| IC208 | PQVINJM2135R | IC | |
| | | (TRANSISTORS) | |
| Q201 | PQVTDTC143E | TRANSISTOR(SI) | |
| Q202 | PQVTDTC143E | TRANSISTOR(SI) | |
| Q203 | PQVTDTA143TU | TRANSISTOR(SI) | |
| Q204 | 2SA1797Q | TRANSISTOR(SI) | |
| Q205 | 2SD1819A | TRANSISTOR(SI) | |
| Q206 | PQVTDTC143E | TRANSISTOR(SI) | |
| Q207 | 2SD1819A | TRANSISTOR(SI) | |
| Q211 | PQVTDTA143TU | TRANSISTOR(SI) | |
| Q213 | PQVTDTC143E | TRANSISTOR(SI) | |
| Q214 | PQVTXP151A13 | TRANSISTOR(SI) | |
| Q216 | 2SD1819A | TRANSISTOR(SI) | |
| | | (DIODES) | |
| D201 | MA2ZD1400 | DIODE(SI) | |
| D202 | MA2ZD1400 | DIODE(SI) | |
| D204 | MA2ZD1400 | DIODE(SI) | |
| D205 | PQVDPTZTE25 | DIODE(SI) | S |
| D209 | MA111 | DIODE(SI) | |
| D211 | MA8150 | DIODE(SI) | |
| D214 | MA8150 | DIODE(SI) | |
| D215 | MA8150 | DIODE(SI) | |
| D216 | PQVDEP10LA03 | DIODE(SI) | |
| D217 | PQVDEC10 | DIODE(SI) | |
| D218 | MA8150 | DIODE(SI) | |
| D219 | MA8150 | DIODE(SI) | |
| D221 | MA111 | DIODE(SI) | |
| D222 | MA111 | DIODE(SI) | |
| | | (LEDS) | |
| LED201 | PQVDSML310MT | LED | |
| LED202 | PQVDSML310MT | LED | |
| LED203 | PQVDSML310MT | LED | |
| LED204 | PQVDSML310MT | LED | |
| LED208 | PQVDBR1111C | LED | S |
| LED210 | LNJ115W8PRA | LED | |
| LED211 | LNJ115W89RA | LED | |
| LED212 | LNJ115W89RA | LED | |
| LED213 | LNJ115W89RA | LED | |
| | | (COILS) | |
| L203 | PQLQR3FL121 | COIL | |
| L204 | PQLQR3FL121 | COIL | |
| L205 | PQLQR3FL121 | COIL | |
| L209 | PQLE1G5K3220 | COIL | |
| L300 | PQLQR4T151M | COIL | |
| L301 | PQLQR4T151M | COIL | |

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| | | (CONNECTORS) | |
| CN201 | PSJS22A62Z | CONNECTOR | |
| CN202 | PSJP02A44Z | CONNECTOR | |
| | | (OTHERS) | |
| MIC | PQJM150Z | MICROPHONE | |
| CN203 | PQJJ1C002Z | JACK/SOCKET | |
| X201 | PQVCI4096N3Z | CRYSTAL OSCILLATOR | |
| G701 | PQMH10424Z | PLATE, METAL | |
| G702 | PQMH10424Z | PLATE, METAL | |
| G703 | PQMH10424Z | PLATE, METAL | |
| G704 | PQMH10424Z | PLATE, METAL | |
| G705 | PQMH10424Z | PLATE, METAL | |
| G706 | PQMH10424Z | PLATE, METAL | |
| | | (RESISTORS) | |
| R201 | ERJ3GEYJ101 | 100 | |
| R202 | ERJ3GEYJ101 | 100 | |
| R203 | ERJ3GEYJ101 | 100 | |
| R204 | ERJ3GEYJ101 | 100 | |
| R205 | ERJ3GEYJ151 | 150 | |
| R206 | ERJ3GEYJ151 | 150 | |
| R207 | ERJ3GEYJ151 | 150 | |
| R209 | ERJ3GEYJ104 | 100k | |
| R210 | ERJ3GEYJ104 | 100k | |
| R211 | ERJ3GEYJ104 | 100k | |
| R212 | ERJ3GEYJ101 | 100 | |
| R213 | ERJ3GEYJ101 | 100 | |
| R214 | ERJ3GEYJ331 | 330 | |
| R215 | ERJ3GEYJ101 | 100 | |
| R216 | ERJ3GEYJ331 | 330 | |
| R217 | ERJ3GEYF434 | 430k | |
| R218 | ERJ3GEYF824 | 820k | |
| R220 | ERJ3GEYJ474 | 470k | |
| R221 | ERJ3GEYJ103 | 10k | |
| R222 | ERJ3GEYJ101 | 100 | |
| R223 | ERJ3GEY0R00 | 0 | |
| R224 | ERJ3GEYJ103 | 10k | |
| R225 | ERJ3GEYJ472 | 4.7k | |
| R226 | ERJ3GEYJ123 | 12k | |
| R227 | ERJ3GEYJ473 | 47k | |
| R228 | ERJ3GEYJ224 | 220k | |
| R229 | ERJ3GEYJ102 | 1k | |
| R230 | ERJ3GEYJ102 | 1k | |
| R231 | ERJ3GEYJ102 | 1k | |
| R232 | ERJ3GEYJ103 | 10k | |
| R234 | ERJ3EKF2204 | 2.2M | |
| R235 | ERJ3EKF2204 | 2.2M | |
| R236 | ERJ3GEYJ104 | 100k | |
| R244 | ERJ3GEYJ104 | 100k | |
| R245 | ERJ3GEYJ103 | 10k | |
| R246 | ERJ3GEYJ393 | 39k | |
| R247 | ERJ3GEYJ391 | 390 | |
| R248 | ERJ3GEYJ393 | 39k | |
| R249 | ERJ3GEYJ222 | 2.2k | |
| R250 | ERJ3GEYJ222 | 2.2k | |

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| R251 | ERJ3GEYJ101 | 100 | |
| R253 | ERJ3GEYJ222 | 2.2k | |
| R265 | ERJ3GEYJ103 | 10k | |
| R272 | ERJ3GEYJ120 | 12 | |
| R273 | ERJ3GEYJ120 | 12 | |
| R274 | ERJ3GEYJ120 | 12 | |
| R275 | ERJ3EKF2203 | 220k | S |
| R276 | ERJ3GEYF104 | 100k | |
| R279 | ERJ3GEYF473 | 47k | |
| R280 | ERJ3GEYJ180 | 18 | |
| R281 | ERJ3GEYJ180 | 18 | |
| R284 | ERJ3GEY0R00 | 0 | |
| R285 | ERJ3GEY0R00 | 0 | |
| R286 | ERJ3GEYJ224 | 220k | |
| R287 | ERJ3GEYJ104 | 100k | |
| R288 | ERJ3GEY0R00 | 0 | |
| R289 | ERJ3GEYJ683 | 68k | |
| R291 | ERJ3GEYJ823 | 82k | |
| C204 | ERJ3GEYJ104 | 100k | |
| C274 | EKJ3GEYJ682 | 6.8k | |
| L202 | ERJ3GEY0R00 | 0 | |
| L206 | ERJ3GEY0R00 | 0 | |
| | | (CAPACITORS) | |
| C203 | ECUV1C104ZFV | 0.1 | |
| C205 | ECUV1H101JCV | 100P | |
| C206 | ECUV1C104KBV | 0.1 | |
| C207 | ECUV1C104KBV | 0.1 | |
| C208 | ECUV1C104KBV | 0.1 | |
| C209 | ECUV1C104KBV | 0.1 | |
| C210 | ECUV1C104KBV | 0.1 | |
| C211 | ECUV1A474KBV | 0.47 | |
| C212 | ECUV1A474KBV | 0.47 | |
| C213 | ECEV0JBS221P | 220 | |
| C214 | ECUV1C104ZFV | 0.1 | |
| C215 | ECUV1A474KBV | 0.47 | |
| C217 | ECUV1C104ZFV | 0.1 | |
| C218 | ECUV1C104ZFV | 0.1 | |
| C219 | ECUV1H470JCV | 47P | |
| C220 | ECST0JC107 | 100 | |
| C221 | ECUV1C104ZFV | 0.1 | |
| C222 | ECUV1C104ZFV | 0.1 | |
| C223 | ECST0JZ106R | 10 | |
| C224 | ECUV1C104ZFV | 0.1 | |
| C225 | ECST0JY475 | 4.7 | |
| C226 | ECUV1C104ZFV | 0.1 | |
| C227 | ECUV1H470JCV | 47P | |
| C228 | ECUV1H103KBV | 0.01 | |
| C229 | ECUV1C104ZFV | 0.1 | |
| C230 | ECUV1C104KBV | 0.1 | |
| C231 | ECUV1A224KBV | 0.22 | |
| C232 | ECUV1C104KBV | 0.1 | |
| C233 | ECUV1C104ZFV | 0.1 | |
| C234 | ECUV1C104ZFV | 0.1 | |
| C236 | ECUV1H060DCV | 6P | S |

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| C237 | ECUV1H060DCV | 6P | S |
| C238 | ECEV0JBS221P | 220 | |
| C239 | ECUV1H103KBV | 0.01 | |
| C249 | ECST0GY226 | 22 | |
| C250 | ECUV1A105ZFV | 1 | |
| C255 | ECUV1C104ZFV | 0.1 | |
| C267 | ECST0JX226 | 22 | |
| C277 | ECUV1H102KBV | 0.001 | |
| C280 | ECUV1C104ZFV | 0.1 | |
| C284 | ECUV1H100DCV | 10P | |
| C286 | ECUV1H100DCV | 10P | |
| C287 | ECUV1C104ZFV | 0.1 | |
| C288 | ECUV1H100DCV | 10P | |
| C289 | ECST0JY475 | 4.7 | |
| C291 | ECST0JTPB337 | 330 | |
| C292 | ECST0JC107 | 100 | |
| C293 | ECUV1H182KBV | 0.0018 | |
| C294 | ECUV1H103KBV | 0.01 | S |
| C295 | ECUV1H102KBV | 0.001 | |
| C297 | ECUV1H100DCV | 10P | |
| C299 | ECUV1H100DCV | 10P | |
| C302 | ECUV1C104ZFV | 0.1 | |
| C303 | ECUV1H471JCV | 470P | S |
| C304 | ECUV1C104KBV | 0.1 | |
| C305 | ECUV1A105ZFV | 1 | |
| C306 | ECST0JZ106R | 10 | |
| C307 | ECUV1H070CCV | 7P | |
| C310 | ECUV1H103KBV | 0.01 | S |
| C320 | PQWYTG2650NR | CAPACITOR ASSEMBLY | S |
| R290 | ECUV1H070CCV | 7P | |

## 22.2.3. RF UNIT PARTS

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| RFM100 | PQWPTG2650KT | RF BLOCK KIT | |

## 22.2.4. ACCESSORIES AND PACKING MATERIALS

| Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|
| A1 | PQWATG2650N | AC ADAPTOR | |
| A2 | PQJA10075Z | TEL CORD | |
| A3 | PQKE10109Z1 | BELT CLIP | S |
| A4 | PQKL10038Z1 | WALL MOUNT ADAPTOR | S |
| A5 | PQQW12294Z | QUICK GUIDE (English) | |
| A6 | PQQW12295Z | QUICK GUIDE (Spanish) | |
| A7 | PQQX12839Z | INSTRUCTION BOOK | |
| P1 | PQPD10440Y | CUSHION | |
| P2 | PQPK13228Z | GIFT BOX | |
| P3 | PQPP170Y | PROTECTION COVER | |
| | | (for Base Unit) | |
| P4 | XZB10X35A02 | PROTECTION COVER | |
| | | (for Handset) | |

# 23. FOR SCHEMATIC DIAGRAM

## 23.1. Base Unit (SCHEMATIC DIAGRAM (Base Unit))

**Notes:**

**1. DC voltage measurements are taken with voltmeter from the negative voltage line.**

> Important Safety Notice:
> Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

**This schematic diagram may be modified at any time with the development of new technology.**

## 23.2. Handset (SCHEMATIC DIAGRAM (Handset))

**Notes:**

**1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.**

**2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.**

# 24. SCHEMATIC DIAGRAM (RF Unit)

## 24.1. RF Unit Reference Drawing

## 24.2. Base Unit

## 24.3. Handset

# 25. OPERATION

## 25.1. Component View

## 25.2. Flow Solder Side View

# 26. SCHEMATIC DIAGRAM (Operation)

# 27. CIRCUIT BOARD (Base Unit)

## 27.1. Component View

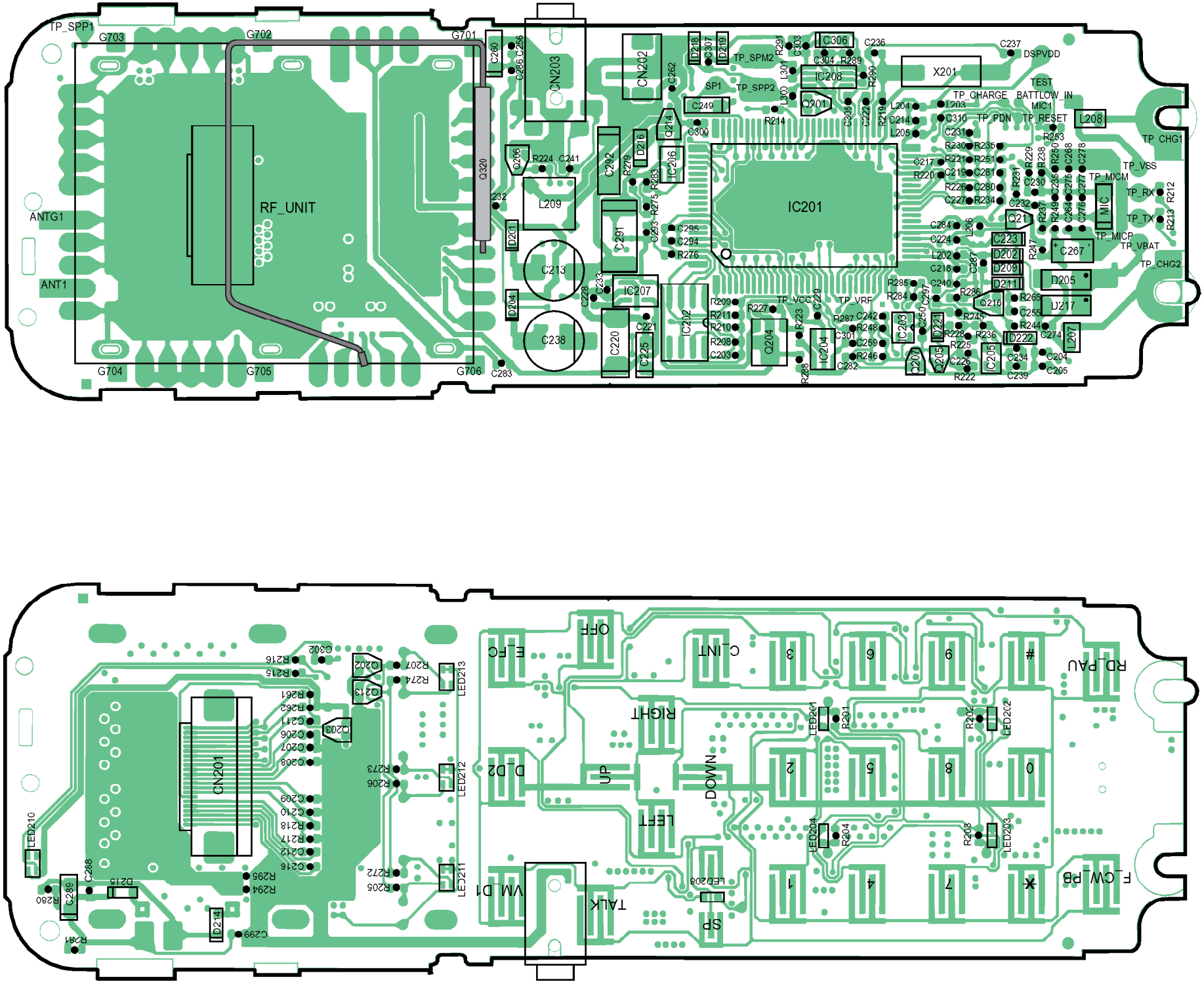
### 27.2. Flow Solder Side View

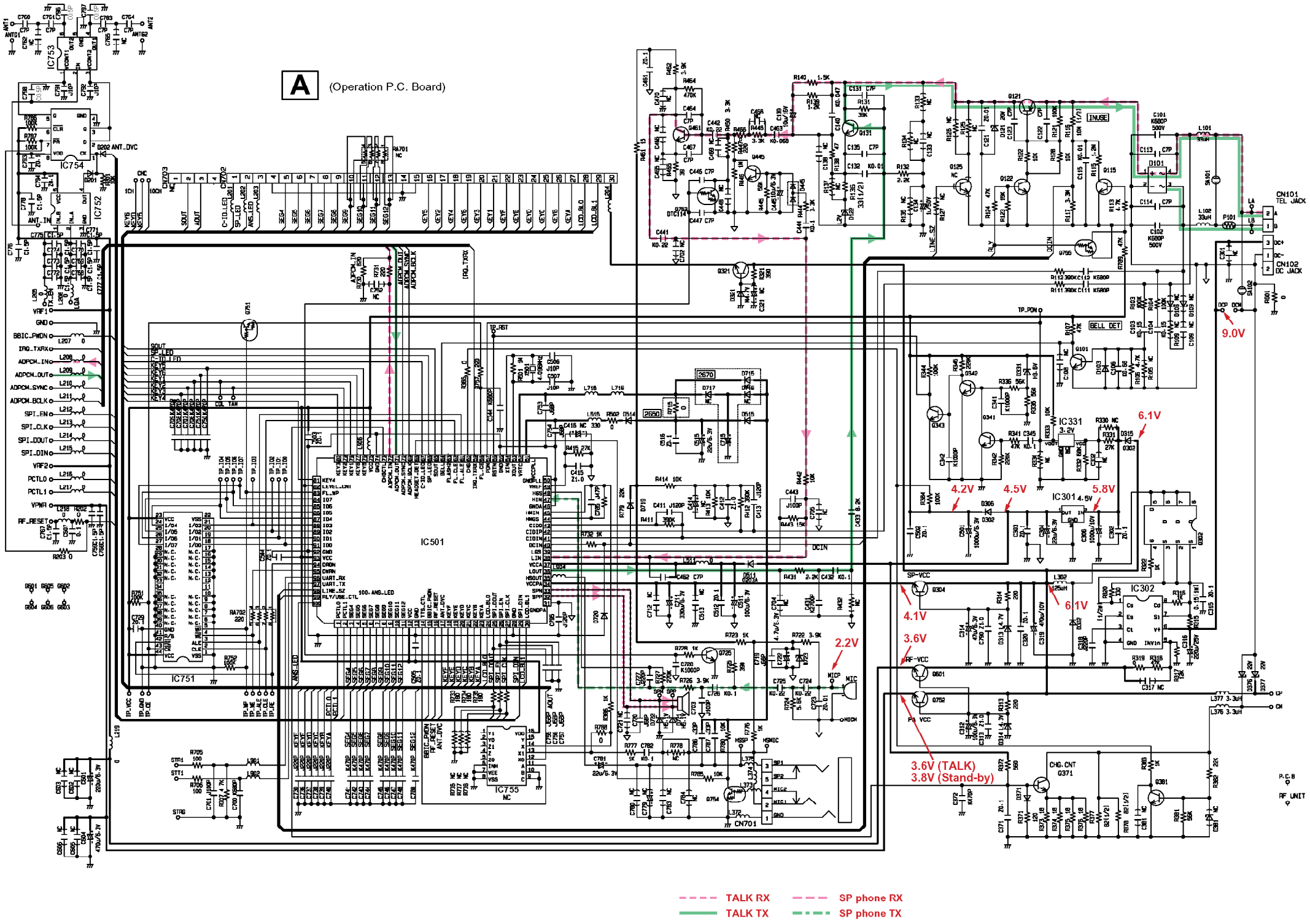
# 28. SCHEMATIC DIAGRAM (Base Unit)

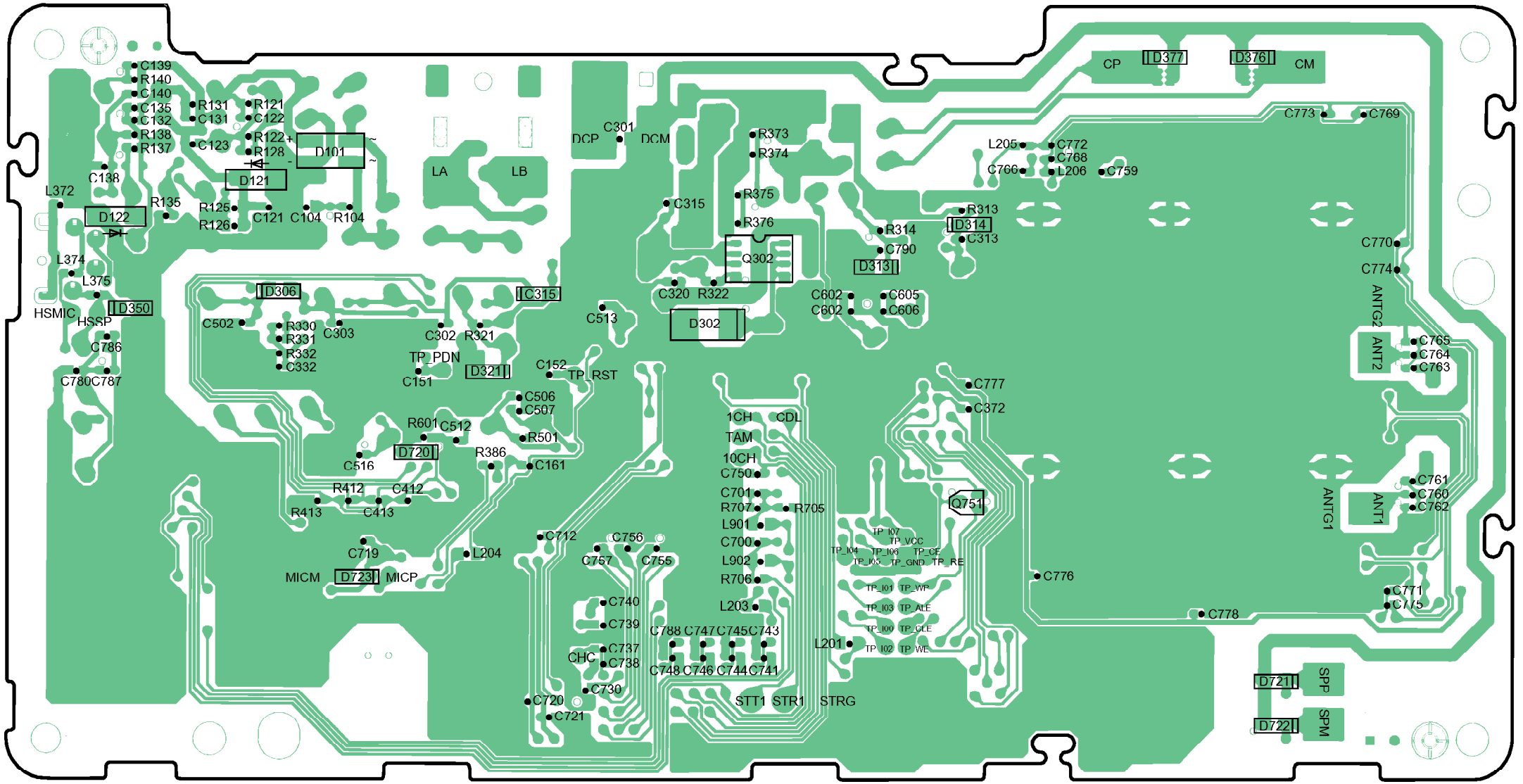
# 29. CIRCUIT BOARD (Handset)

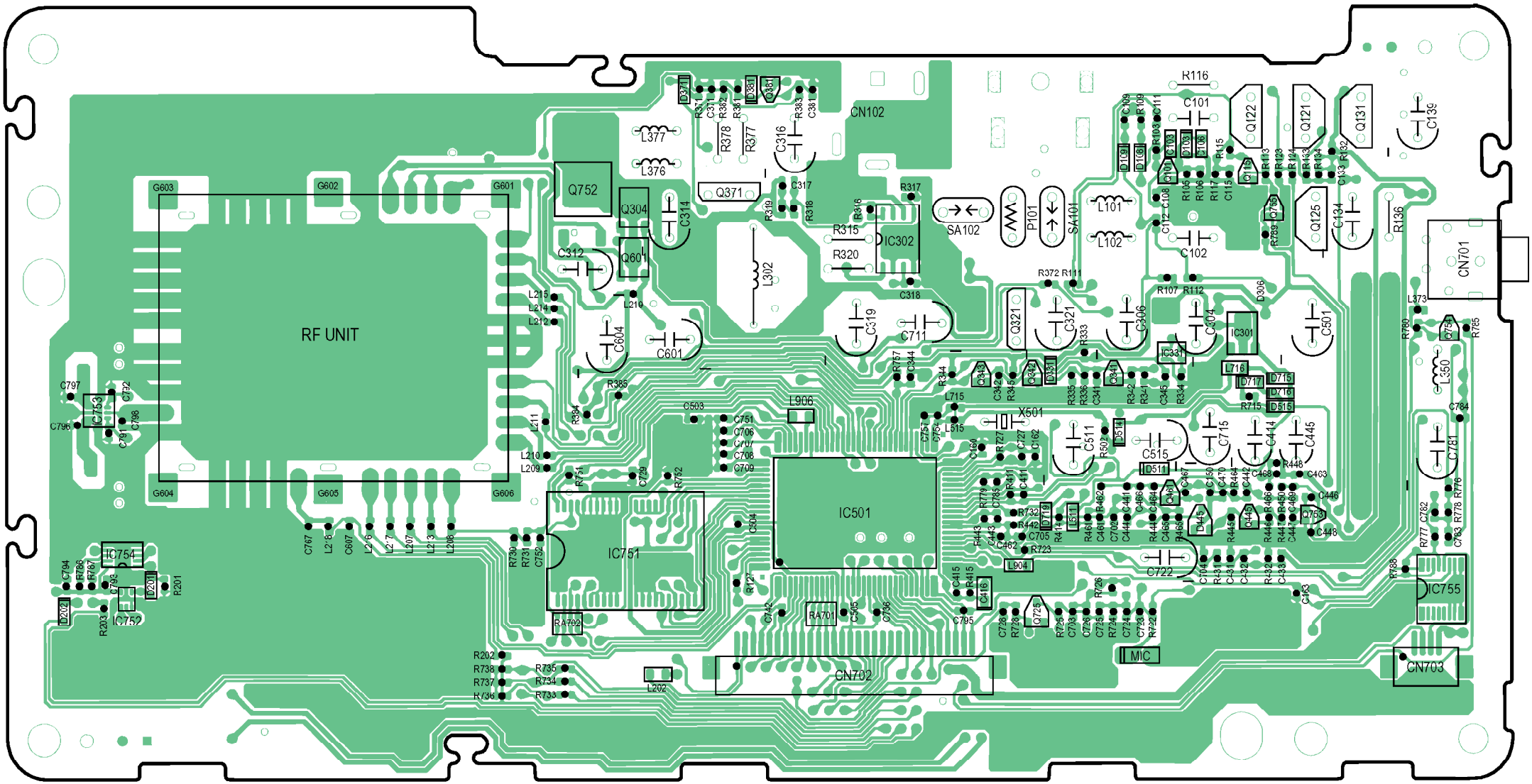
# 30. SCHEMATIC DIAGRAM (Handset)

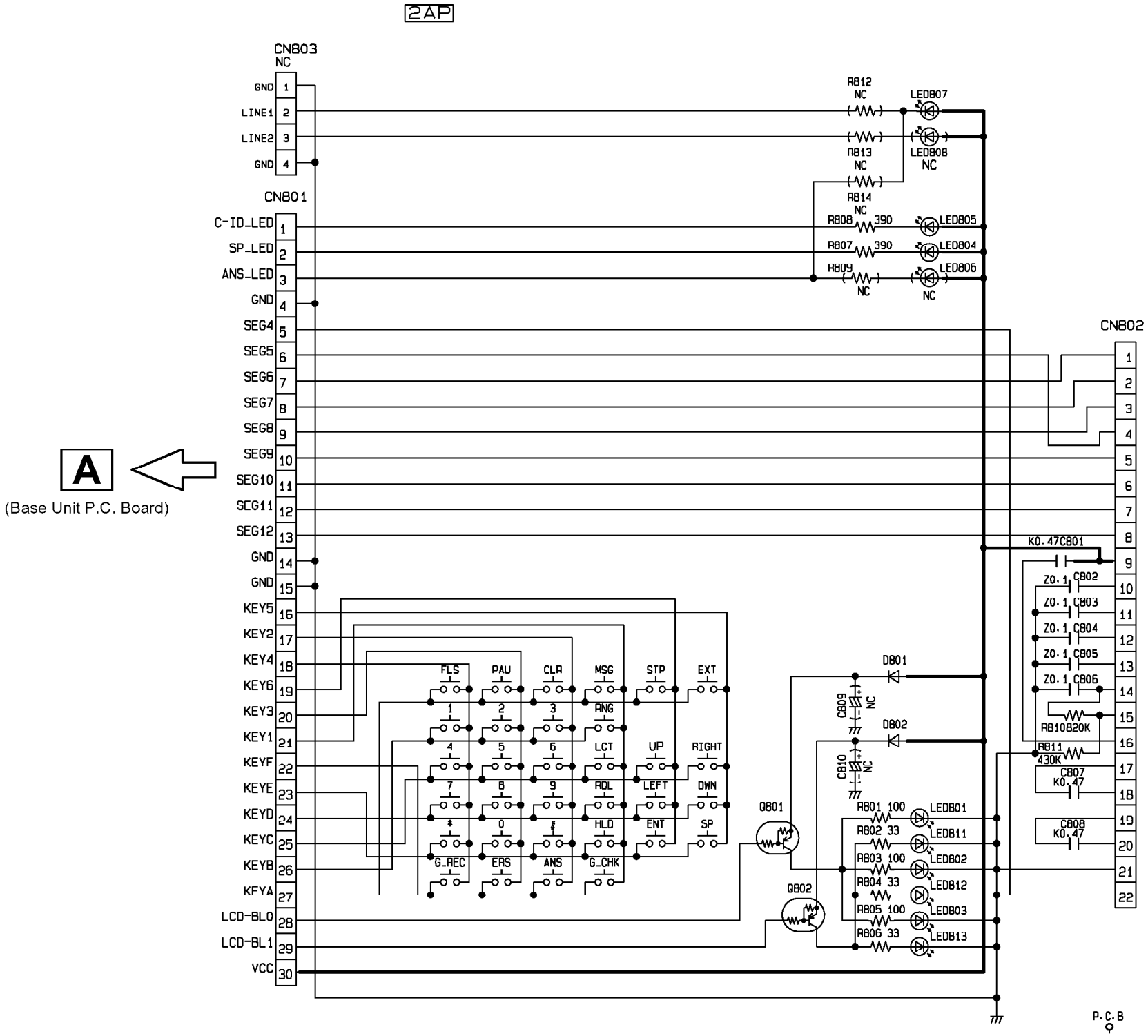
**U (Q) / KXTG2650N / Printed in Japan**

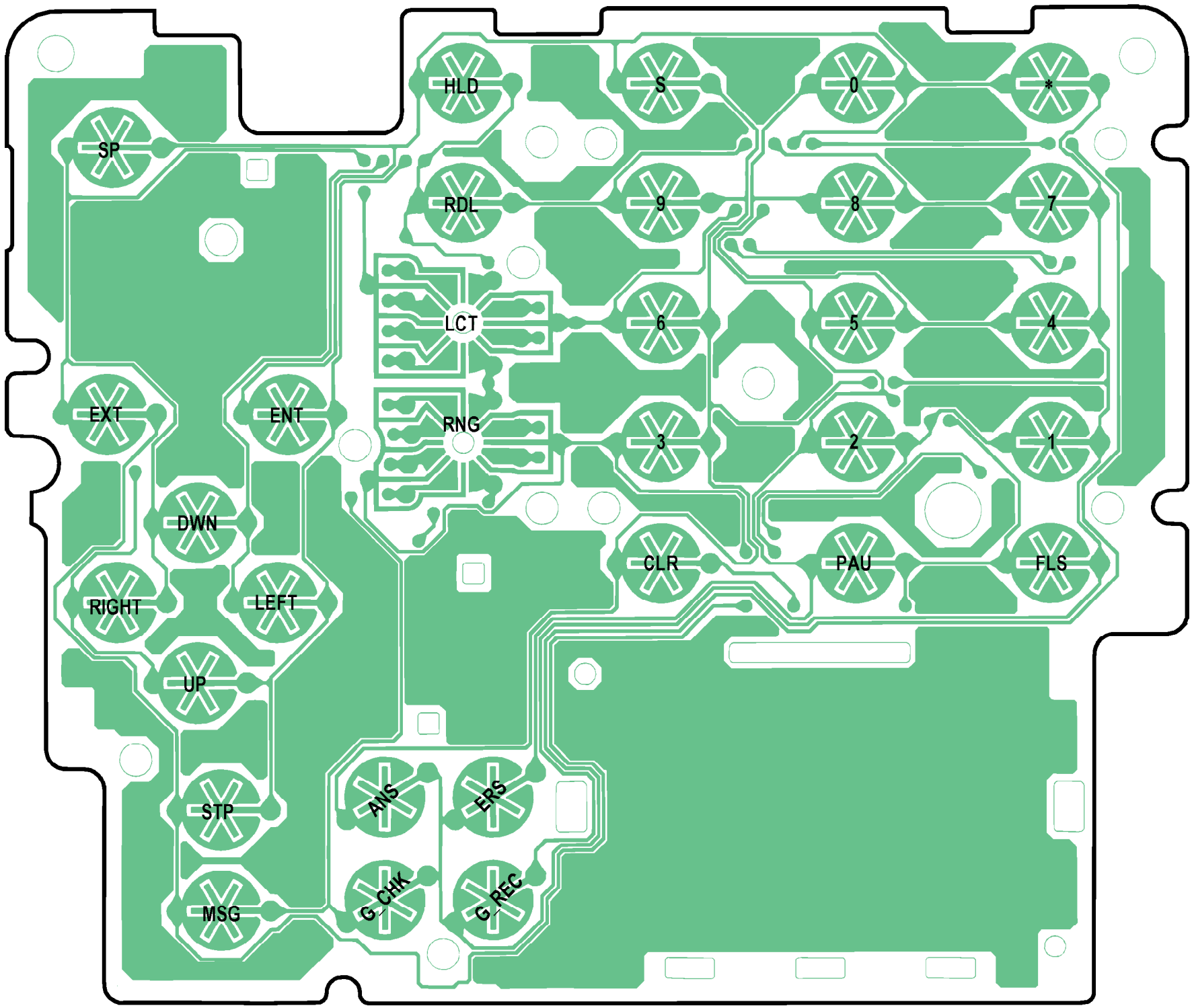

TP_SPP1
G703
G702
G701
RF_UNIT
ANTG1
ANT1
G704
G705
G706
CN203
CN202
IC201
X201
DSPVDD
TEST
BATTLOW_IN
MIC1
TP_CHARGE
TP_PDN
TP_RESET
TP_CHG1
TP_VSS
TP_MICM
TP_RX
TP_TX
TP_MICP
TP_VBAT
TP_CHG2
MIC
TP_SPM2
TP_SPP2
SP1
TP_VCC
TP_VRF
IC306
IC208
IC207
IC206
IC202
IC203
IC204
IC205
Q201
Q204
Q205
Q206
Q211
Q214
Q320
D201
D202
D204
D205
D206
D207
D209
D211
D216
D217
D218
D219
D221
D222
L201
L202
L203
L204
L205
L206
L207
L208
L209
C213
C220
C221
C225
C238
C267
C291
C292
C301
C306
C307
C309
C320
C321
C322
C323
C324
C325
C326
C327
C328
C329
C330
C331
C332
C333
C334
C335
C336
C337
C338
C339
C340
C341
C342
C343
C344
C345
C346
C347
C348
C349
C350
C351
C352
C353
C354
C355
C356
C357
C358
C359

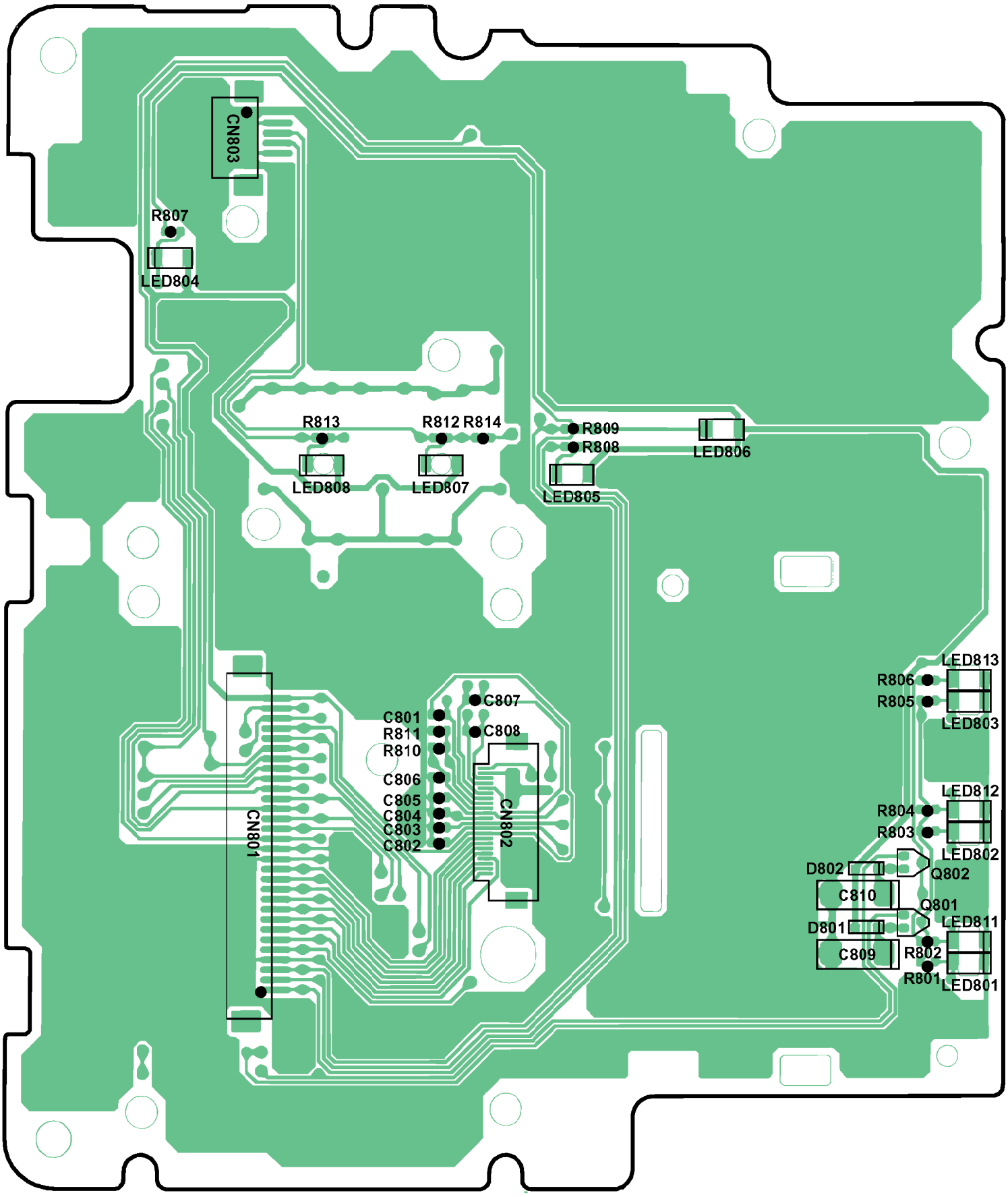

A
(Operation P.C. Board)
IC501
IC751
IC754
IC753
IC752
IC755
IC331
IC301
IC302
CN101
TEL JACK
CN102
DC JACK
CN701
9.0V
6.1V
4.2V
4.5V
5.8V
4.1V
3.6V
2.2V
3.6V (TALK)
3.8V (Stand-by)
TALK RX
TALK TX
SP phone RX
SP phone TX

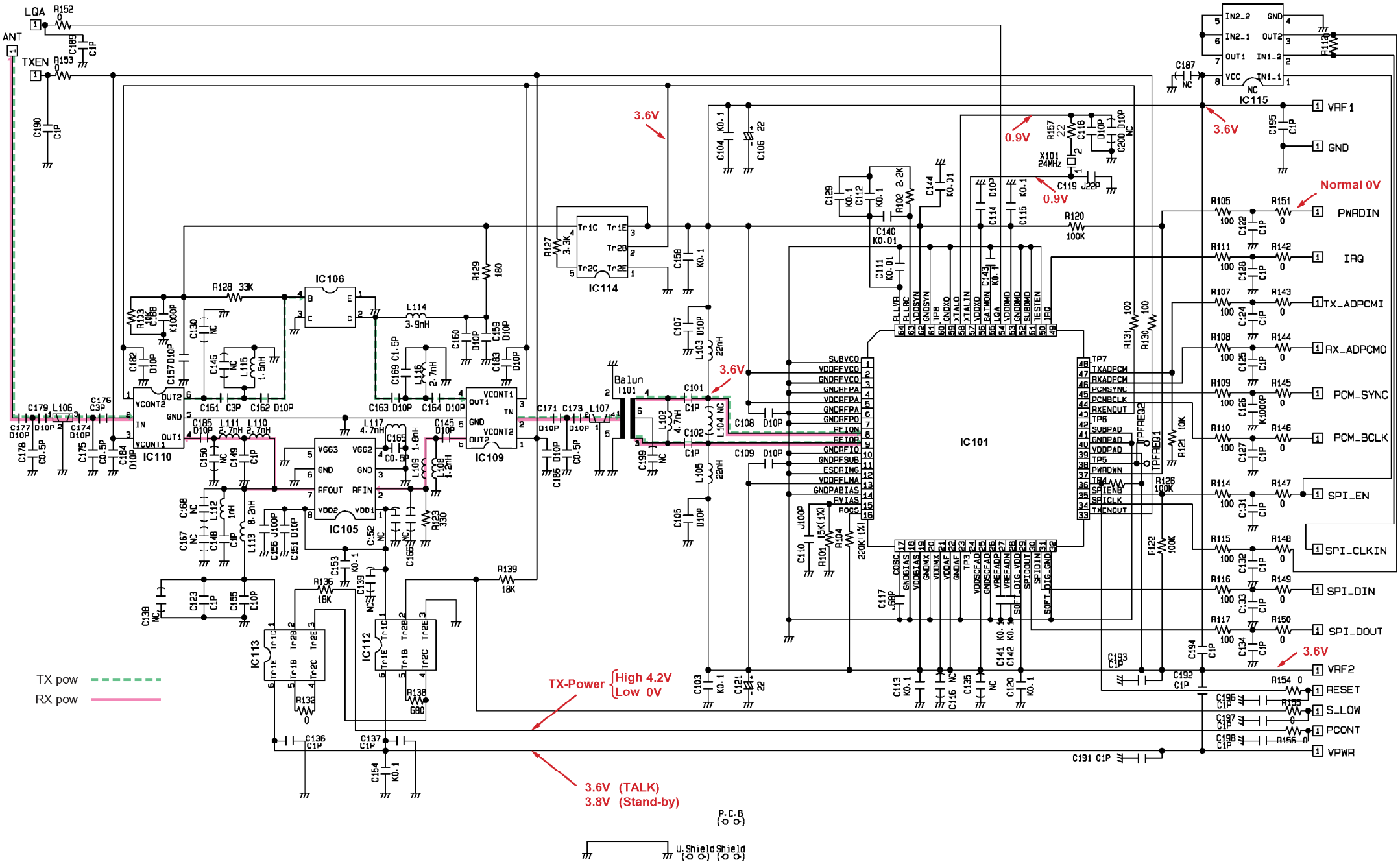

C139
R140
C140
C135
C132
R138
R137
R131
C131
R121
C122
R122+
R128
C123
D101
D121
C138
L372
D122
R135
R125
R126
C121
C104
R104
L374
L375
HSMIC
D350
HSSP
C786
C780C787
D306
C502
R330
R331
R332
C332
C303
C302
R321
TP_PDN
C151
D321
C152
TP_RST
C506
C507
R601
C512
C516
D720
R386
R501
C161
R412
C412
R413
C413
C719
L204
MICM
D723
MICP
C712
C756
C757
C755
C740
C739
C737
C738
C730
C720
C721
LA
LB
DCP
C301
DCM
C315
R373
R374
R375
R376
Q302
C320
R322
D302
IC315
C513
C602
C602
C605
C606
R314
C790
D313
R313
D314
C313
L205
C772
C768
L206
C766
C759
C773
C769
C770
C774
ANTG2
ANT2
C765
C764
C763
CP
D377
D376
CM
C777
C372
1CH
CDL
TAM
10CH
C750
C701
R707
L901
C700
L902
R706
L203
C788
C747
C745
C743
CHC
C748
C746
C744
C741
STT1
STR1
STRG
R705
IQ751
TP_I07
TP_VCC
TP_I04
TP_I06
TP_CE
TP_I05
TP_GND
TP_RE
TP_I01
TP_WP
TP_I03
TP_ALE
TP_I00
TP_CLE
TP_I02
TP_WE
L201
C776
C778
ANTG1
ANT1
C761
C760
C762
C771
C775
D721
SPP
D722
SPM

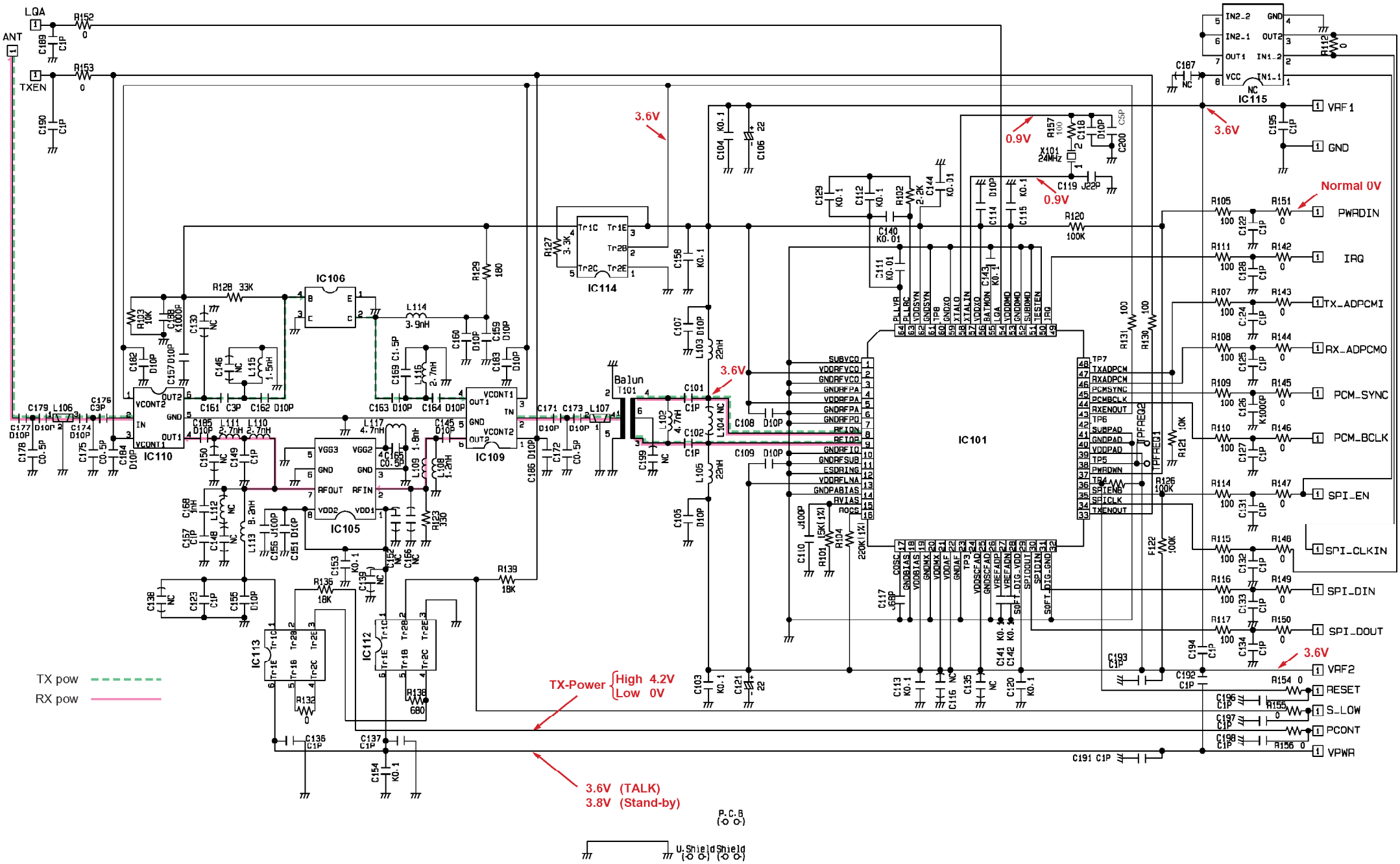

RF UNIT
IC501
IC751
IC752
IC753
IC754
IC755
IC301
IC302
CN102
CN701
CN702
CN703
X501
L906
L904
Q752
Q371
Q304
Q601
Q321
Q722
Q725
Q121
Q122
Q125
Q131
Q134
SA102
SA101
P101
RA701
RA702
MIC
G601
G602
G603
G604
G605
G606

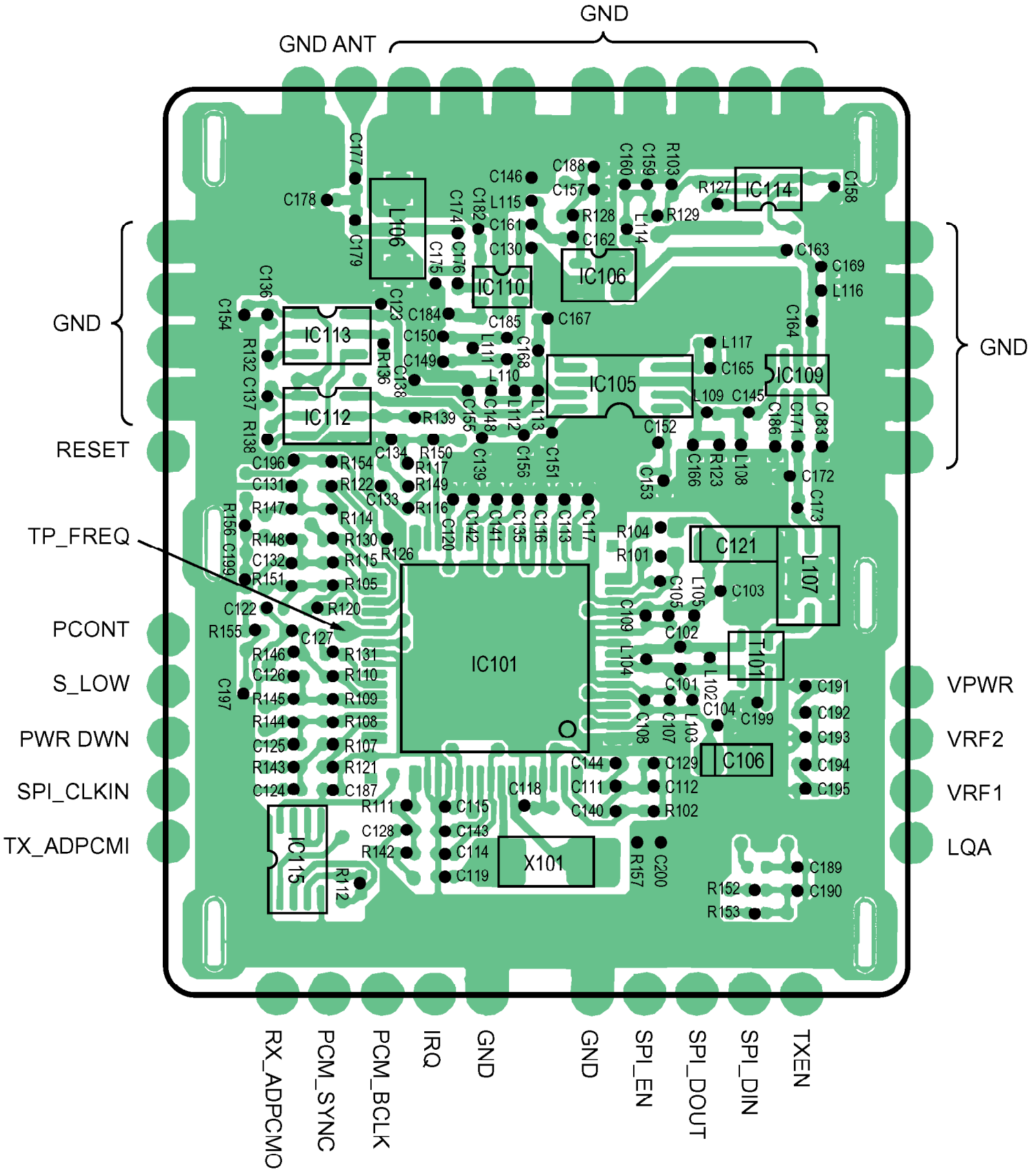

2AP
CN803
NC
GND 1
LINE1 2
LINE2 3
GND 4
CN801
C-ID_LED 1
SP_LED 2
ANS_LED 3
GND 4
SEG4 5
SEG5 6
SEG6 7
SEG7 8
SEG8 9
SEG9 10
SEG10 11
SEG11 12
SEG12 13
GND 14
GND 15
KEY5 16
KEY2 17
KEY4 18
KEY6 19
KEY3 20
KEY1 21
KEYF 22
KEYE 23
KEYD 24
KEYC 25
KEYB 26
KEYA 27
LCD-BL0 28
LCD-BL1 29
VCC 30
A
(Base Unit P.C. Board)
R812 NC
LED807
R813 NC
LED808 NC
R814 NC
R808 390
LED805
R807 390
LED804
R809 NC
LED806 NC
CN802
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
K0.47C801
Z0.1 C802
Z0.1 C803
Z0.1 C804
Z0.1 C805
Z0.1 C806
RB10820K
R811 430K
C807 K0.47
C808 K0.47
FLS PAU CLR MSG STP EXT
1 2 3 ANG
4 5 6 LCT UP RIGHT
7 8 9 RDL LEFT DWN
* 0 # HLD ENT SP
G_REC ERS ANS G_CHK
D801
D802
C809 NC
C810 NC
Q801
Q802
R801 100
LED801
R802 33
LED811
R803 100
LED802
R804 33
LED812
R805 100
LED803
R806 33
LED813
P.C.B

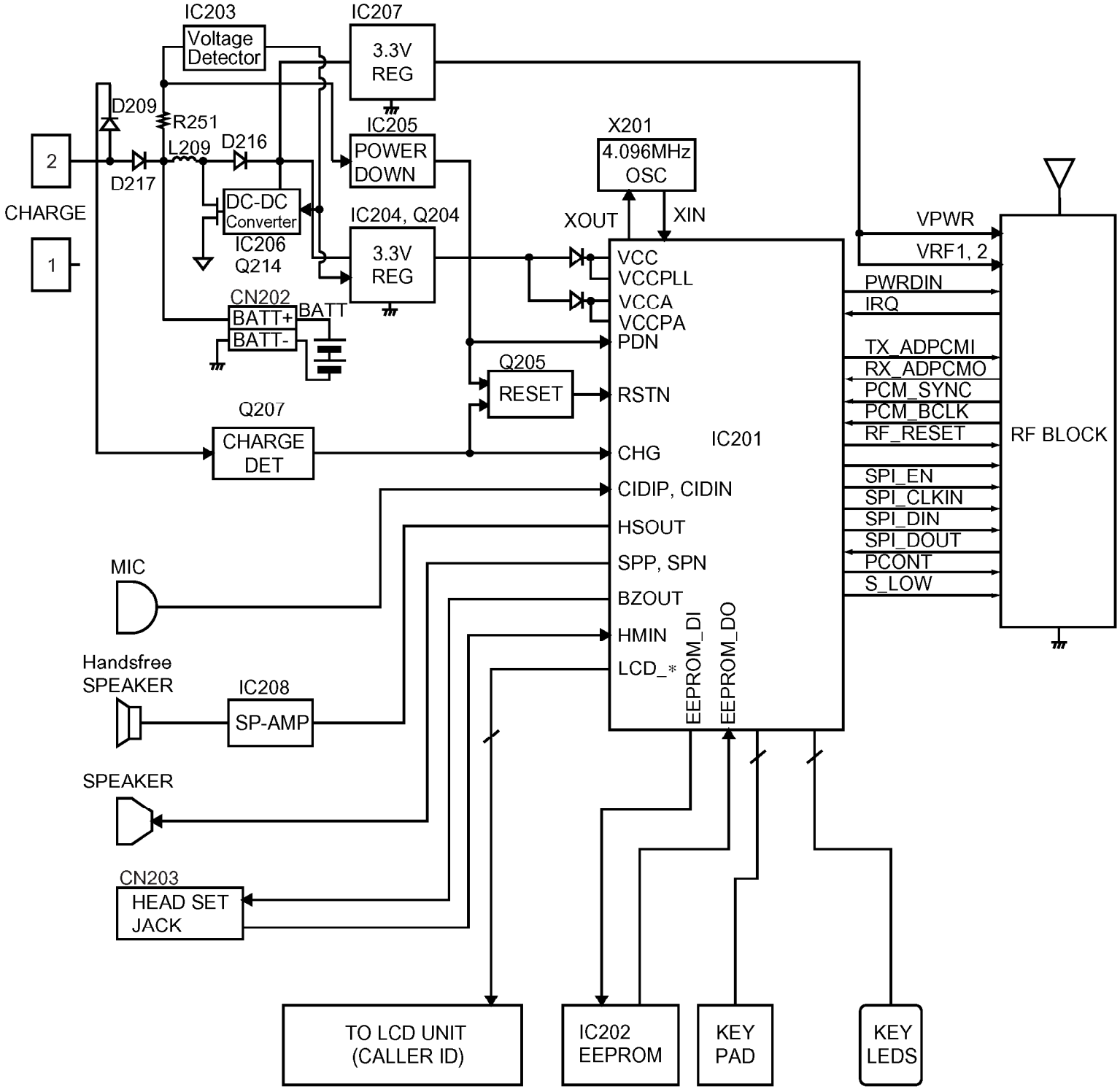

HLD
S
0
*
SP
RDL
9
8
7
LCT
6
5
4
EXT
ENT
RNG
3
2
1
DWN
CLR
PAU
FLS
RIGHT
LEFT
UP
STP
ANS
ERS
MSG
G_CHK
G_REC

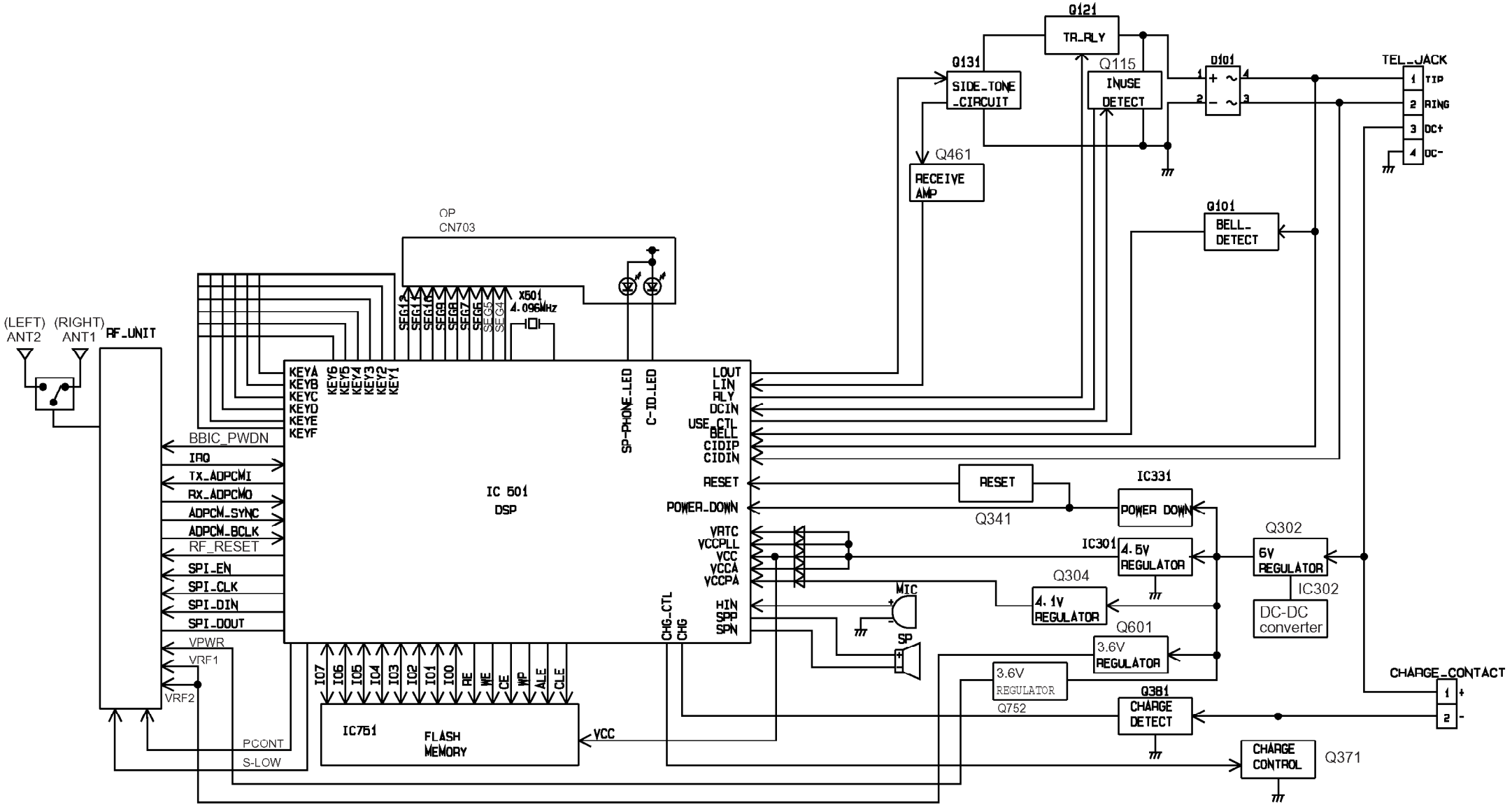

CN803
R807
LED804
R813
R812
R814
LED808
LED807
R809
R808
LED806
LED805
LED813
R806
R805
LED803
C807
C801
C808
R811
R810
C806
C805
C804
C803
C802
CN802
CN801
LED812
R804
R803
LED802
D802
Q802
C810
Q801
D801
LED811
C809
R802
R801
LED801

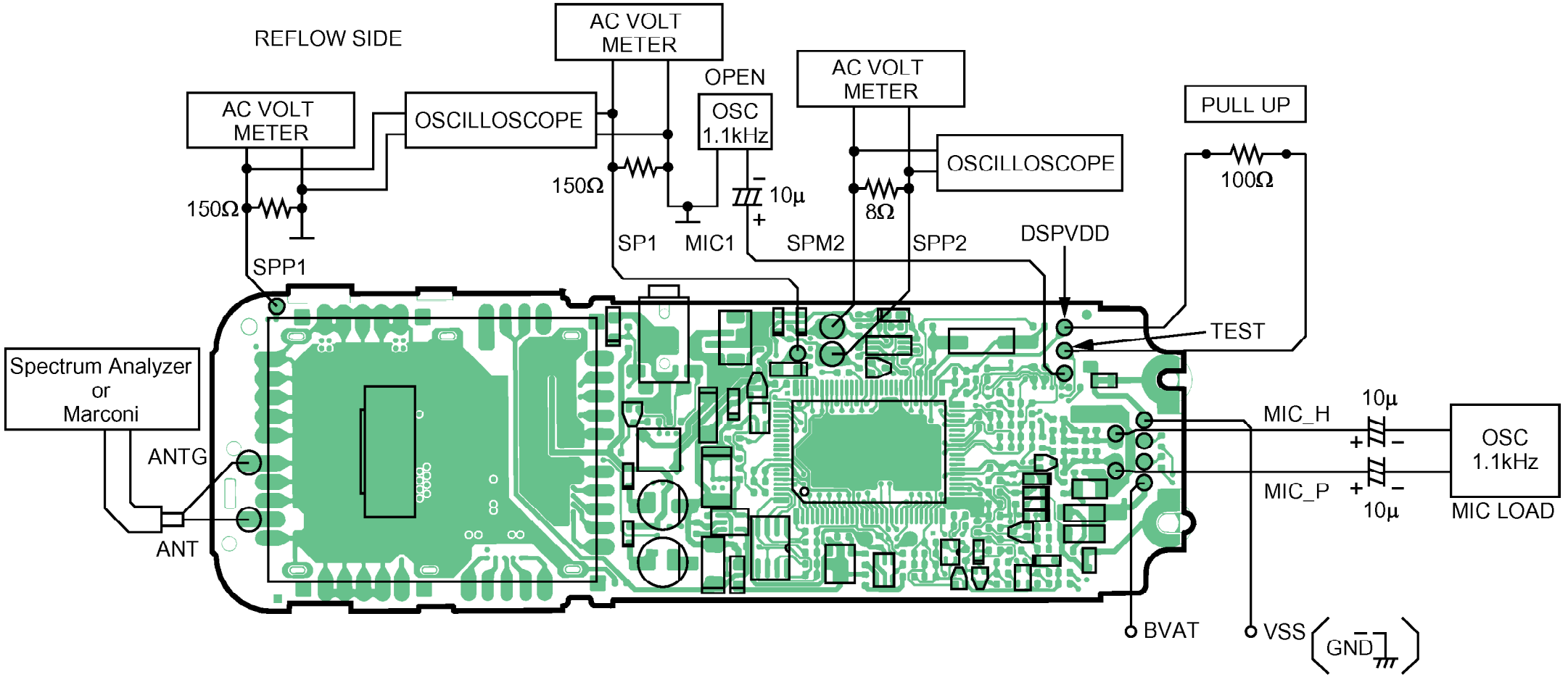

ANT
LQA
TXEN
IC101
IC105
IC106
IC109
IC110
IC112
IC113
IC114
IC115
3.6V
0.9V
Normal 0V
Balun T101
X101 24MHz
VRF1
GND
PWRDIN
IRQ
TX_ADPCMI
RX_ADPCMO
PCM_SYNC
PCM_BCLK
SPI_EN
SPI_CLKIN
SPI_DIN
SPI_DOUT
VRF2
RESET
S_LOW
PCONT
VPWR
TX pow
RX pow
TX-Power
High 4.2V
Low 0V
3.6V (TALK)
3.8V (Stand-by)
P.C.B
U.Shield
Shield

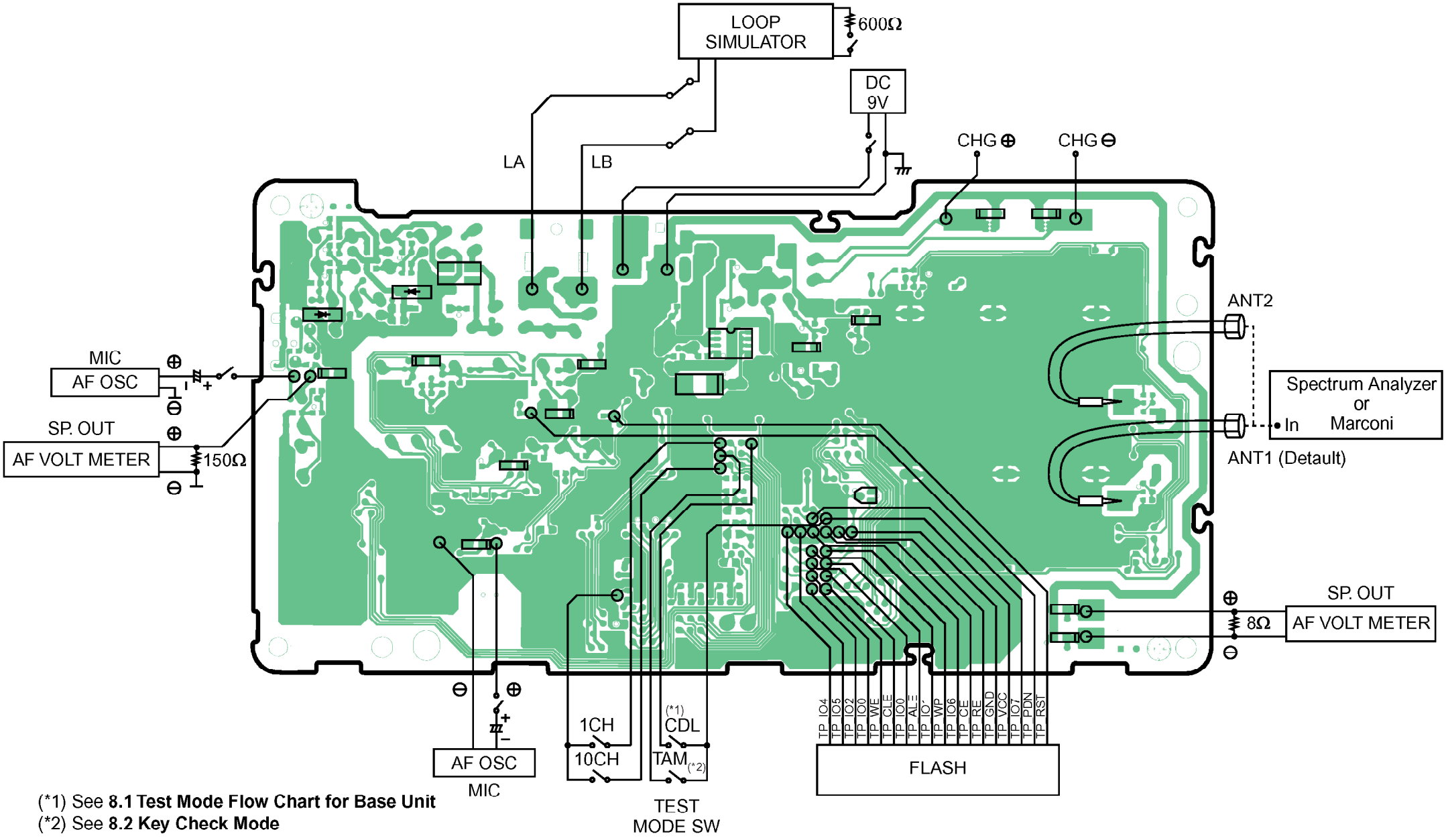

ANT
LQA
TXEN
IC101
IC105
IC106
IC109
IC110
IC112
IC113
IC114
IC115
Balun T101
X101 24MHz
3.6V
0.9V
Normal 0V
VRF1
GND
PWRDIN
IRQ
TX_ADPCMI
RX_ADPCMO
PCM_SYNC
PCM_BCLK
SPI_EN
SPI_CLKIN
SPI_DIN
SPI_DOUT
VRF2
RESET
S_LOW
PCONT
VPWR
TX pow
RX pow
TX-Power
High 4.2V
Low 0V
3.6V (TALK)
3.8V (Stand-by)
P.C.B
U.Shield
Shield


GND
GND ANT
GND
RESET
TP_FREQ
PCONT
S_LOW
PWR DWN
SPI_CLKIN
TX_ADPCMI
GND
VPWR
VRF2
VRF1
LQA
RX_ADPCMO
PCM_SYNC
PCM_BCLK
IRQ
GND
GND
SPI_EN
SPI_DOUT
SPI_DIN
TXEN
IC101
IC105
IC106
IC109
IC110
IC112
IC113
IC114
IC115
C121
L107
T101
C106
X101

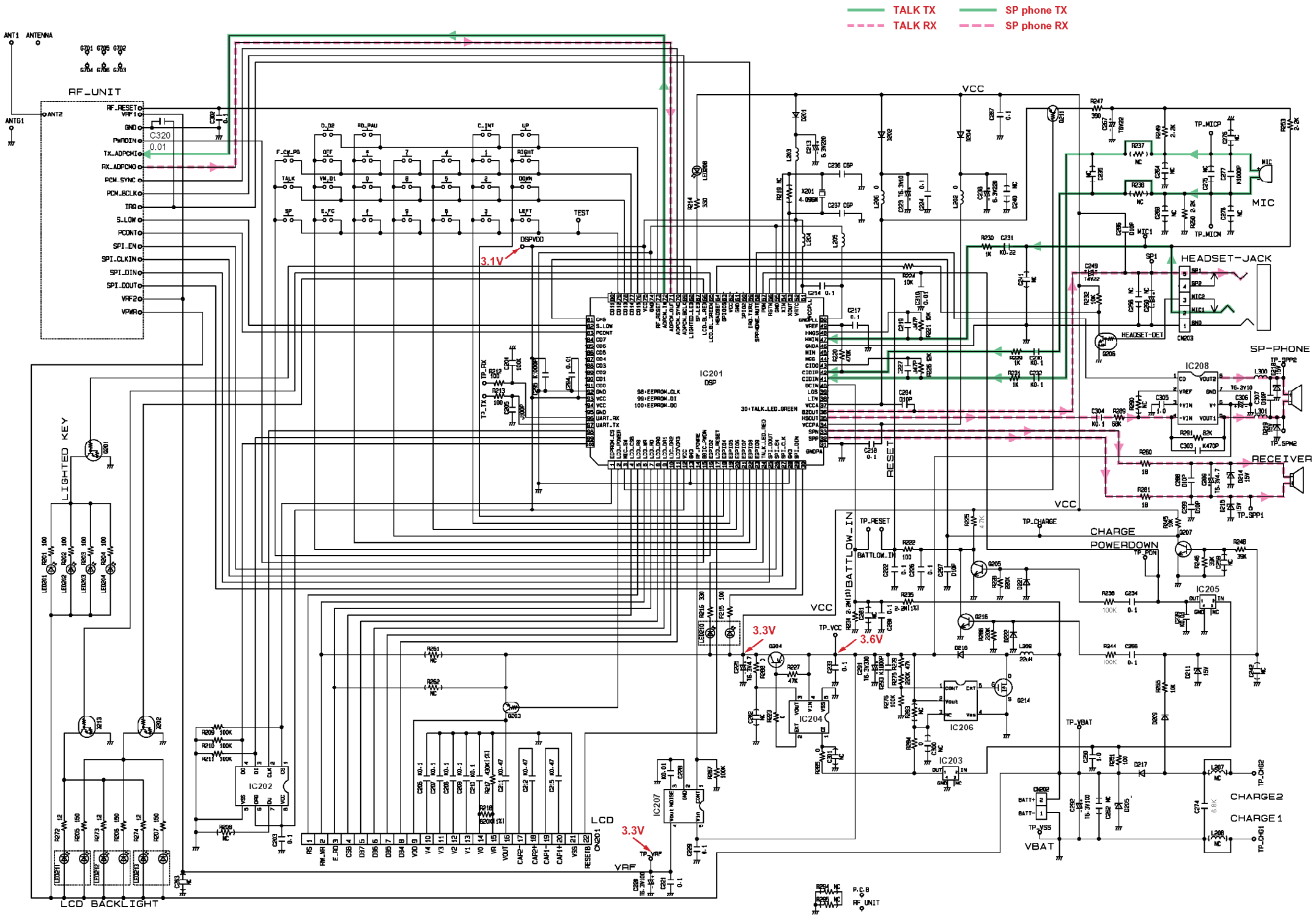

IC203
Voltage Detector
IC207
3.3V REG
D209
R251
L209
D216
D217
IC205
POWER DOWN
X201
4.096MHz OSC
2
CHARGE
1
DC-DC Converter
IC206
Q214
IC204, Q204
3.3V REG
XOUT
XIN
VPWR
VRF1, 2
CN202
BATT+
BATT-
BATT
VCC
VCCPLL
VCCA
VCCPA
PDN
PWRDIN
IRQ
TX_ADPCMI
RX_ADPCMO
PCM_SYNC
PCM_BCLK
RF_RESET
Q205
RESET
RSTN
Q207
CHARGE DET
IC201
CHG
CIDIP, CIDIN
HSOUT
SPP, SPN
BZOUT
HMIN
LCD_*
EEPROM_DI
EEPROM_DO
SPI_EN
SPI_CLKIN
SPI_DIN
SPI_DOUT
PCONT
S_LOW
RF BLOCK
MIC
Handsfree SPEAKER
IC208
SP-AMP
SPEAKER
CN203
HEAD SET JACK
TO LCD UNIT (CALLER ID)
IC202 EEPROM
KEY PAD
KEY LEDS


(LEFT) ANT2
(RIGHT) ANT1
RF_UNIT
OP
CN703
X501
4.096MHz
IC 501
DSP
KEYA
KEYB
KEYC
KEYD
KEYE
KEYF
KEY6
KEY5
KEY4
KEY3
KEY2
KEY1
SEG12
SEG13
SEG14
SEG9
SEG8
SEG7
SEG6
SEG5
SEG4
SP-PHONE_LED
C-ID_LED
LOUT
LIN
RLY
DCIN
USE_CTL
BELL
CIDIP
CIDIN
RESET
POWER_DOWN
VRTC
VCCPLL
VCC
VCCA
VCCPA
HIN
SPP
SPN
CHG_CTL
CHG
BBIC_PWDN
IRQ
TX_ADPCMI
RX_ADPCMO
ADPCM_SYNC
ADPCM_BCLK
RF_RESET
SPI_EN
SPI_CLK
SPI_DIN
SPI_DOUT
VPWR
VRF1
VRF2
PCONT
S-LOW
IO7
IO6
IO5
IO4
IO3
IO2
IO1
IO0
RE
WE
CE
WP
ALE
CLE
IC751
FLASH MEMORY
VCC
Q121
TR_RLY
Q131
SIDE_TONE _CIRCUIT
Q115
INUSE DETECT
D101
TEL_JACK
1 TIP
2 RING
3 DC+
4 DC-
Q461
RECEIVE AMP
Q101
BELL_ DETECT
RESET
Q341
IC331
POWER DOWN
IC301
4.5V REGULATOR
Q302
6V REGULATOR
IC302
DC-DC converter
Q304
4.1V REGULATOR
MIC
SP
Q601
3.6V REGULATOR
3.6V REGULATOR
Q752
Q381
CHARGE DETECT
CHARGE_CONTACT
CHARGE CONTROL
Q371


REFLOW SIDE
AC VOLT METER
OPEN
AC VOLT METER
PULL UP
AC VOLT METER
OSCILLOSCOPE
OSC 1.1kHz
OSCILLOSCOPE
150Ω
150Ω
10µ
8Ω
100Ω
SP1
MIC1
SPM2
SPP2
DSPVDD
SPP1
TEST
Spectrum Analyzer or Marconi
ANTG
ANT
MIC_H
MIC_P
10µ
10µ
OSC 1.1kHz
MIC LOAD
BVAT
VSS
GND




(*1) See **8.1 Test Mode Flow Chart for Base Unit**
(*2) See **8.2 Key Check Mode**


TALK TX
TALK RX
SP phone TX
SP phone RX
ANT1 ANTENNA
RF_UNIT
ANTG1
ANT2
RF_RESET
VRF1
GND
PWRDIN
TX_ADPCMI
RX_ADPCMO
PCM_SYNC
PCM_BCLK
IRQ
S_LOW
PCONT
SPI_EN
SPI_CLKIN
SPI_DIN
SPI_DOUT
VRF2
VPWR
C320
0.01
C302
0.1
IC201
DSP
3.1V
DSPVDD
VCC
RESET
LIGHTED KEY
LCD BACKLIGHT
LCD
CN201
IC202
IC203
IC204
IC205
IC206
IC207
IC208
3.3V
3.6V
TP_VCC
TP_VRF
VRF
BATTLOW_IN
TP_RESET
CHARGE
POWERDOWN
TP_CHARGE
TP_PCN
TP_VBAT
TP_VSS
VBAT
CHARGE2
CHARGE1
HEADSET-JACK
HEADSET-DET
MIC
SP-PHONE
RECEIVER
TP_SPP2
TP_SPM2
TP_SPP1
TP_MICP
TP_MICM
TP_CHG2
TP_CHG1
P.C.B
RF_UNIT